



EXTENSION OF SUBWAY

AND

RAPID TRANSIT IMPROVEMENTS

BOYLSTON STATION

TO

FOREST HILLS

PRELIMINARY REPORT

PRAEGER - MAGUIRE
AND
SINGSTAD & BAILLIE
ENGINEERS
BOSTON, MASS.



ANGSTAD & BAILLIE GOVOZ-982

Mr. Edward Dana, Gameral Manager Metropolitics Travell Anthority Park Square Building

EXTENSION OF SUBWAY

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AND

RAPID TRANSIT IMPROVEMENTS

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PRELIMINARY REPORT

PRAEGER-MAGUIRE

SINGSTAD & BAILLIE

ENGINEERS

294 WASHINGTON STREET BOSTON 8, MASSACHUSETTS

July 24, 1952

Mr. Edward Dana, General Manager Metropolitan Transit Authority Park Square Building Boston 16, Massachusetts

> Re: Extension of Subway and Rapid Transit Improvements - Boylston Station to Forest Hills

Dear Sir:

In conformance to the terms of our contract to prepare preliminary designs, plans and estimate of cost for the construction of a subway and rapid transit system from the existing Boylston Street Subway to the existing Forest Hills Station in the City of Boston, we hereby respectfully submit our report covering the preliminary phase of our contract.

This phase of our contract requires that we:

- A. Review the studies previously made by the Metropolitan Transit Authority and others.
- B. Conduct subsurface investigations of the soil throughout the entire site, and
- C. Prepare preliminary designs, plans, and cost estimates.

Prior to and after receipt of our contract we examined the entire area involved in the proposed project in the field, studied the drawings of layouts which had been made by others and discussed the details of the project with your engineers.

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Prior to and after receipt of our contract we examined the entire area involved in the proposed project in the field, studied the drawings of layouts which had been made by others and discussed the details of the project with your engineers.

An instrument survey was made of the entire length of the project. A contract was awarded for borings which was supervised by our engineers. Undisturbed soil samples were obtained and have been analysed in a soils laboratory.

A survey of adjacent buildings and of all subsurface utilities was made and the results plotted on drawings.

We have prepared preliminary designs, plans, specifications and estimates of cost. Some three hundred drawings which are the result of our investigations and designs accompany this report.

Attached to our drawings are prints of drawings of the track
work, signal system, power and lighting facilities which were prepared
by the Engineering Department of the Metropolitan Transit Authority.

Our studies and designs are based on the "Legislative Route" as indicated on the 1" = 400' scale drawing prepared by the Metropolitan Transit Authority, dated March 15, 1948. In addition, we have made designs, drawings and estimates of an alternate route at and adjacent to the Dudley Street Station and the results of this study are included in this report.

During the course of our work it has been necessary to confer at frequent intervals with members of your Engineering Department, and in order to arrive at a solution which is satisfactory to both your engineers and to ourselves, numerous changes and revisions to our original design have been made.

In certain locations difficult engineering problems were encountered, as for examples, (a) the section adjacent to the N.Y.,

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N. H. & H. R. R. embankment where the right of way lies above the Stony Brook culvert, (b) the construction at Dudley Street, and (c) the crossing under the combined right of ways of the New York, New Haven and Hartford and the Boston and Albany Railroads at Washington Street.

At the latter location we prepared two designs, one based on the open cut method of construction and an alternate scheme based on a shield driven tunnel. Meetings were held with representatives of the Engineering Departments of both railroads, and we have approvals of both companies to construct this section under their right of ways by either the tunnel or the open cut method. Agreements have also been reached with the N. Y., N. H. & H. R. R. in connection with the construction of the embankment section adjacent to the Railroad right of way.

The underground section otherwise presented no unusual problems. Designs of reinforced concrete and structural steel with concrete jack arches were made both at and between stations. The reinforced concrete design proved more economical between stations whereas the steel and jack arch scheme proved to be more advantageous at stations.

Difficult problems involving maintenance of traffic were encountered at the Boylston Street and Forest Hills connections and also at Dudley Street. At the latter site not only rapid transit operations must be maintained but heavy surface vehicular and pedestrian traffic must be coped with.

We have endeavoured in all cases to use a minimum of critical materials without jeopardizing the quality of the construction.

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We have endeavoured in all cases to use a minimum of critical materials without jeopardizing the quality of the construction.

The preparation of cost estimates presents a problem in this period of relative instability of the construction industry. Our estimates, however, reflect our best judgment, confirmed by prices of contemporary construction, of the cost of the work included in our contract. The total cost of the Legislative Route has been estimated to be \$35,000,000, and that of the Alternate Route \$33,000,000.

Either route will function satisfactorily, but it is our opinion that the Alternate Route is the better solution from design, construction, operation and maintenance viewpoints and will better serve the traveling public.

The estimates of cost include in addition to construction of the new work and demolition of the existing elevated structure, the costs of track work, signal system, power, lighting, station equipment, contractor's overhead and profit, real estate condemnation costs, demolition, engineering, legal and administrative costs, contingencies and interest on funds required during construction.

We believe that a satisfactory solution of the problems encountered in this study has been developed. We desire to express our appreciation of the opportunity afforded to participate in this study, and to acknowledge the helpful cooperation rendered to our firms by your Engineering Department.

With the submission of this report we are of the opinion that we have complied with the requirements of the preliminary phase of our contract. It is requested that the details of our report be given such study as you may desire. Any corrections or changes

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that we have complled that the requested that the details of our report
by given such great are traped to the details of our report.

which you may consider necessary will be given our prompt attention.

Respectfully submitted,

Praeger-Maguire and

Singstad & Balillie

Charles a Magninia all Singotas David G. Baillie J

will be given our prompt attention.

Respectfully described,

Praeger-Maguire

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Singstad & Bailfie

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Murid B. Bulling

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PRAEGER-MAGUIRE

AND

SINGSTAD & BAILLIE

ENGINEERS

294 WASHINGTON STREET BOSTON 8, MASSACHUSETTS

EXTENSION OF SUBWAY

AND

RAPID TRANSIT IMPROVEMENTS

BOYLSTON STATION TO FOREST HILLS

Preliminary Report

Description of Project

The project covered by this preliminary report involves the provision for a new rapid transit facility to replace the existing elevated railroad structure between the Boylston Street station at the northerly extremity near La Grange Street and Brookley Road adjacent to the Forest Hills Station at the southerly limit. The elevated structure was constructed some forty-seven years ago and accommodates two tracks. The present structure extends through Washington Street and, as in the case of most such overhead railroad facilities, has resulted in retarding the development and improvement of the adjacent properties with consequent loss of adequate tax returns to the City. In addition to being an eyesore it is a nuisance because of resultant noise and dirt.

The new construction is to consist of an underground structure from the existing subway at the north extending through Washington Street and Shawmut Avenue to Columbus Avenue, a

AND SINGSTAD & BAILLIE

STREET, SQUARE BUILDING

EXTENSION OF SUBWAY

AND

RAPID TRANSIT IMPROVEMENTS BOYLSTON STATION TO FOREST HILLS

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The uses non-repulsed to the consists of an entry proceed attending the control attending the control the control of the contr

distance of 15,390 feet, where a transition of 690 feet will occur and the structure will extend above grade on an embankment parallel with and adjacent to that of the New York, New Haven and Hartford Railroad right of way 5640 feet to a point about 100 feet north of Williams Street. At this location the construction will return to Washington Street on an elevated structure 1070 feet long joining the existing elevated structure at Brookley Road adjacent to the Forest Hills Station.

Present and Future Methods of Operation

The elevated structure which is to be replaced by the new construction consists of two tracks which provide two way rapid transit operation between the Boylston Station and Forest Hills Station with stations at Dover, Northampton, Dudley, Egleston and Green St., terminating at the Forest Hills Station.

Two track operation will be provided in the new facility
and stations and traffic interchanges will be provided at corresponding
locations to those of the present line.

Details of the Project

(A) The Railroad Undercrossing

Near the start of the project at the north a somewhat difficult construction problem is encountered in the crossing of the subway under the tracks of the New York, New Haven and Hartford and the Boston and Albany Railroads. The originally proposed alignment has been shifted slightly to the west at this location to avoid crossing

distance of 16, 175 fee, where a French of Worset will occur and the starting will resent as medern on as contact with and adjacent to that of the New York. He a lines and Hartford Natheral with and right of way belonged to a joint and 100 feet couts of Williams Scroet. At this is also occur our resolution will refur to Washington Street on the elevant order of the local starting stranged at the structure at Brookley Road adjacent to the Forest Hills Station.

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under the two structures which carry the street traffic and the present

Washington Street Elevated structure over the depressed railroad right

of way. Nevertheless, it will be necessary to lower the new structure so
that the track elevation is about 39 feet below the street surface and 23
feet below the track elevation of the railroads. The relatively low ground
elevation and the necessity of performing the construction without unduly
interfering with heavy main line railroad operations result in difficult
construction operations.

Performing the above operation by the shield tunnel method would obviate interference with railroad operations and designs and drawings have been prepared for constructing this section by that method. However, the section is relatively short (705 feet of twin tube construction of which 115 feet is under the railroad right of way) and almost as much costly compressed air and other tunneling equipment would be required as would serve for a tunnel of much greater length.

The shield tunnel method for this crossing contemplates two cast iron lined tubes, adequately caulked for watertightness, and lined with concrete. One shield will be used for driving the tubes, one tube to be driven from a shield chamber to be constructed at Broadway, the northerly limit of the tunnel to Cobb Street, the southerly limit of the tunnel, where the shield will be reversed and the second tube driven north to Broadway. The shield tunnel method requires the lowering of the subway track a maximum of about 5 feet below that required by the open cut method in order to provide sufficient cover over the tops of the tunnels at the railroad crossing. The shield tunnel design includes a

which the tender of the contract of the new structure and of way. Nevertheless, it will be necessary to lower the new structure as the time the contract of th

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 sump and pump chamber at the low point of the crossing under the railroad.

Designs have also been prepared for constructing this section by the open cut method using a scheme similar to one which was successfully carried out during the construction of a subway section under the tracks and right of way of the Boston and Albany Railroad at Huntington Avenue several years ago.

Drawings of suggested methods of open cut and tunnel construction were submitted to both railroads and after detailed study both methods were approved. A drawing of a scheme of the open cut method, prepared by the New York Central Railroad (owning company of the Boston and Albany) and approved by the New York, New Haven and Hartford Railroad has been incorporated in our report drawings. This scheme differs slightly in detail from a scheme submitted to the railroads by our office.

(B)Typical Underground Section

After passing the undercrossing of the Railroads the new facility will be constructed by the open cut method. The line swings from Washington Street to the west and reaches Shawmut Avenue at Dover Street. This short section extends between streets and under buildings which must be underpinned. From Dover Street the subway extends through Shawmut Avenue to Woodbury Street where the line swings east through private property to reach the Dudley Street Station. The line then swings back to Washington Street through which it extends to Valentine Street and thence to the portal east of Columbus

road.

Designs have also been prepared for constructing this section

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Drawings of suggested methods of open cut and tunnel constitution.

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After passing the undercrossing of the Railroads the new

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Avenue. There are to be underground stations at Union Park Street,

Massachusetts Avenue and Dudley Street.

The street will be decked over during construction, permitting continuance of street traffic with occasional temporary detours during isolated construction operations. Residents along the route will be inconvenienced and traffic reduced at times, but the character of Shawmut Avenue and other streets affected and the part which these streets now play in the overall pattern of city traffic is such that relatively little inconvenience will be experienced. In consideration of the magnitude of the project and the ultimate benefit which will result, some inconvenience must be tolerated.

Many designs and estimates were prepared to determine the best and most economical solution of the underground problem. Economy in the use of critical materials (particularly structural steel) were given consideration and other materials substituted wherever possible without sacrifice of quality. For the relatively long repetitive sections between stations, reinforced concrete rigid frame construction was found to be most desirable and this type of design has been used under streets. A combined steel and concrete section was adopted under buildings. At the stations structural steel members with concrete jack arches spanning between wall columns and roof beams proved to be the more desirable method. Except at crossovers, where the roof spans between the exterior walls, there are supporting members between the northbound and southbound tracks.

Avenue. There are to be note.

Massachusetts Avenue and Dudley Street.

The street will be deduced any debug continuance of stract traffic will accept and temperate debug and temperate will be derived is continuance of stract traffic will accept a street and traffic reduced at the problem of the reduced by the continuance of the c

Many designs and estimates were prepared to determine the best and send and southbound and southbound tracks.

The floor of the subway between stations is of reinforced concrete while structural steel and concrete inverts were used in stations. The mezzanine floors are of concrete and structural steel construction. The details of design of the underground construction varies with the depth, nature of soil, ground water level and other conditions.

The floor, walls and roof are to be waterproofed throughout the entire length.

(C) Ventilation

Provision for ventilating the entire underground section of this project has been made in accordance with the best modern practice.

action of moving trains pushing or drawing air through openings in the subway walls or in the subway roof from connecting flues terminating in gratings located in the sidewalk adjacent to the curb. Seven (7) emergency fan chambers have been provided at intervals along the subway structure, each fan chamber containing two axial flow fans. The system is designed for four (4) complete changes of air per hour and will only be used in cases of emergency.

(D) Station Treatment

The three underground stations, Union Park Street,
Massachusetts Avenue and Dudley Street, are of similar general
design. Two side platforms have been provided in each case and
the stairways and space for escalators have been located
outside of the neat lines of the platforms. Columns have been

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placed on fifteen foot centers longitudinally and located five feet inside the edge of the platforms.

Provision has been made for turnstiles, change booths,
toilets and other facilities. In all stations except the Dudley Street
Station (Alternate Route) where long passageways are provided, a
mezzanine about 100 feet in length extends over both platforms and
tracks. A minimum vertical clearance of eight feet six inches has
been provided over mezzanine floors and ten feet eight inches over
station platforms. Vertical and horizontal clearances, both at and
between stations, have been provided to meet the requirements of safe
railroad operation with present and foreseeable future equipment.
Minimum radii of curvature, vertical grade and other details are also
in accordance with safe rapid transit operations.

emergency walk and niches have been provided for track workers in the center walls. At the Union Park Street and Massachusetts

Avenue stations provision has been made for escalators from the mezzanine to the street. At the Dudley Street Station (Legislative Route) escalators are provided between the mezzanine and the street surface, between the street surface and the bus loop platform, and between the mezzanine and the bus loop platform. In the initial contract an escalator will be installed in the Union Park Street

Station from the mezzanine to the street and all planned escalators will be installed in the Dudley Street Station.

Wherever possible, the stairs from the mezzanine to the

placed on a force (concentration) in the learnest like feet leader the the case of the platforms.

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A bench over the duct bank at both sidewalls provides an vertical in the center walls. At the Union Park Street and Massachusetts the center walls, at the Union Park Street and Massachusetts without provided between the mezzanine and the street street set the mezzanine and the bus loop platform. In the initial between the mezzanine and the bus loop platform. In the initial contract an escalator will be installed in the Union Park Street set ion from the mezzanine to the street and all planned escalators will be the Dudley Street Station.

Wherever possible, the stairs from the mezzanine to the

street have been located inside of the building line in existing buildings which will be altered to suit this condition. Where stairways are to be located outside the building line, parapets and railings of dignified simple design are to be provided.

The station platform and mezzanine floors and stairs will be of reinforced concrete with non-slip finish on stairs and platform perimeter. Columns and walls are to be surfaced with tile and concrete ceilings and exposed steel will be painted. Provision will be made for advertising space on station walls.

(E) Above Ground Section

The portal of the underground section is located in the grounds of the Notre Dame Academy at Ritchie Street. At this location the tracks rise at a 3% grade and extend on a steel structure to the station at Columbus Avenue. Leaving the Columbus Avenue Station the right of way extends in a southwesterly direction on an extension of the earth embankment of the New York, New Haven and Hartford Railroad. Material for the extension of this embankment can most economically be obtained from the subway cut. The side slope of the embankment will be planted to prevent erosion. The right of way will be protected adjacent to the "New Haven" right of way at the top and on the property line at the bottom by chain link fences.

Designs and drawings were made of various types of structural steel and reinforced concrete structures for this section, but the earth embankment method proved to be the more desirable. Overhead structures will be provided at Atherton, Boylston and Green Streets

street have need secured entitle of the building line in cataling buildings which will be altered to suit this condition. Where stairs ways are to be focused outsits the building line, purapell and railings of dignified simple design are to be provided.

The station platform and mezzanine floors and stairs will be of reinforced concrete with non-stap times on stairs and platform perimeter. Columns and walls are to be surfaced with tile and concrete collings and exposed start will be parted. Providing will be made for advertising space on station walls.

(E) Above Ground Section

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for the full width of the street with vertical clearance to permit passage of maximum allowable height vehicles.

1. Stony Brook Culvert

The existence of a large brick culvert under the right of way presented a somewhat difficult design problem. A field survey of this structure and an analysis of its strength indicated that it could not safely carry the proposed additional superimposed load.

Various strengthening schemes were investigated, including the installation of a new lining of reinforced concrete, lining with steel plates, and the installation of interior struts. Consideration was even given to the advisability of demolishing the culvert and constructing a new structure outside the right of way. One scheme, consisting of driving piles adjacent to the side walls and constructing a new roof over the top, proved to present undesirable construction hazards and would entail extremely high costs.

Our field survey indicated that in several locations the arched roof deflected downward and the side walls deflected outward, indicating excessive roof load. The deflections were not great and relatively few cracks were found, but this condition led to a method which was given thorough detailed study.

This scheme consists of the installation of pre-cast reinforced concrete beams placed continuously and adjacent to each other over the top of the culvert structure, supported a short distance beyond each side wall with a space provided between the top of the culvert and for the full width of the street with vertical clearance to permit passage of maximum allowable height vehicles.

I. Steny Brook

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This scheme consists of the installation of pre-cast rein-

the underside of the beams. These beams are designed to support the new earth surcharge load and the live load of the rapid transit trains.

The culvert roof pressure would thereby not be increased while the side pressure would be slightly increased. The resulting new stresses in the structure were analyzed and found to be within safe limits.

Many discussions of this problem were held with your Engineers. As a result of these discussions we have decided to incorporate in the estimate presented herein a scheme involving the installation of circular corrugated steel plates. These plates are to be joined to form a large circular conduit which has been designed to carry all loads from the new construction. The resulting cross-sectional area is only slightly less than that of the masonry culvert.

This installation should preferably be made in dry
seasons. Openings will be made in the culvert roof at intervals and
prefabricated sections of circular plates installed in sequence favorable
to jointing. The space between the existing masonry culvert and the
new steel plates will be filled with grout installed under pressure.
The interior surface of the lining will be covered with shotcrete.

As noted above, the estimate presented herein includes the cost of the "Corrugated Steel Liner Plate Method" for reinforcing the Stony Brook Culvert. A detailed estimate of the "Precast Beam Method", which is on file in our office, indicates that the costs of both methods are approximately the same.

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carry all loads from the new construction. The resulting cross
tional area is only slightly less than that of the masonry cuivert.

. both methods are anniversimately the esti-

(F) Overhead Construction

Steel overhead construction is necessary at the junction of the embankment and the new subway structure and at the southerly end of the embankment where the right of way returns to the existing elevated structure at Washington Street and the Forest Hills Station. Both articulated column and girder and rigid frame designs were investigated. In some sections, particularly near the junction at Washington Street where clearance and other requirements result in a non-symmetrical pattern, articulated construction is indicated. In other locations the rigid frame type is considered preferable both from aesthetic and economic viewpoints and this method is proposed in these locations.

Except for incidental details, where welding may be used, the steel will be fabricated and field connected with rivets.

(G) Overhead Stations

Avenue and the other at Green Street. As in the case of the subway section, side platforms have been provided with a mezzanine for turnstiles and other operational requirements located between the street surface and the platform level. At Columbus Avenue the stairs and future escalators are located outside of the platform but at the Green Street Station right of way clearance requirements make it necessary to locate the stairway within the neat lines of the platforms.

Concrete, steel and other durable materials have been

(g) Over/med Contraction

Seed everyond and an incompany expenses, at the justices of the ambankment and incompany expenses expenses to the embankment where the right of easy accords to the entropy elevated structures at Washington Justic and attended the Toront Helia Station. Both arthoughted column and girtler and right frame designs were investigated.

In some sections, particularly was the countin at Washington Scient where extending a stationary and extended to an on-apparent pattern, activated arcticular acquirements and ether acquirements and ether acquirements and entered and extended in other headings like along the same and along the same and along the same arcticular and the same and along the same along the same and along the same and along the same and along the same along the same and along the same and along the same and along the same along the same and along the same along the same and along the same and along the same along the same and along the same along t

Except for incidental details, where welding may be used, the steel will be fabricated and field connected with rivets.

[D] Developed Maharen

There are only two overhead stations, one at Columbus

Arenae and the other at Green strends with a meaning the section attended on the column tarners of the standard of the

Concrete, which are the this namerials have been

indicated in the station construction. Exposed structural steel is to be painted. Tile will not be used for finish as has been proposed in the below ground stations. In the final phase consideration may be given to the use of aluminum or stainless steel in side walls and other locations.

(H) Connections at Extremities

The connection of the new section to the existing subway at

Boylston Street Station, where the elevated system descends from the
superstructure to the underground right of way, involves an operation which must be accomplished without seriously interfering with
existing rapid transit operations. Much of the new work will be
performed during periods of minimum operations and the structural
closure will be made after the traffic has been switched to the new
facility.

At the Forest Hills end, part of the present overhead structure will be altered and reused in the new system. Here again a scheme of construction has been developed which will permit making the connection with a minimum of interference with rapid transit operations.

Traffic Interchanges

Interchanges between surface busses and trolleys are to be provided at the Dudley Street Station and at the Columbus Avenue Station. Many schemes were considered at these locations, the Dudley Street interchange presenting some difficult problems. At

ainted. Tile will not be used for finish as has been proposed in the below ground stations. In the final phase consideration may be given to the use of aluminum or stainless steel in side walls and other

(10) Describes at Entremotics

The connection of the new section to the existing subway at superstructure to the underground right of way, involves an operation which must be accomplished without seriously interfering with existing rapid transit operations. Much of the new work will be performed during periods of minimum operations and the structural closure will be made after the traffic has been switched to the new

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Traffic Interchanges

Interchanges between surface busses and trolleys are to be presented. Many schemes were consistent to the station. Many schemes were consistent to the station of the stati

this location peak hour traffic is particularly heavy and the solution is complicated by the existence of the overhead bus station in addition to platforms at the street surface. The proposed solution maintains both the street surface loading facilities and the easterly loop of the overhead bus terminal.

Uninterupted escalator service will be provided between the mezzanine level of the subway and the elevated bus terminal. Additional escalators will operate between the mezzanine level and the street surface and from the street surface to the elevated bus terminal.

At Columbus Avenue the problem is less involved and what we believe to be a straightforward, relatively simple layout has been provided.

Alternate Route, Dudley Street

The Legislative Route provides for a connection between the subway in Shawmut Avenue and the existing Dudley Street bus terminal. This requires that the alignment be detoured from Shawmut Avenue to Washington Street. Between these arteries the right of way extends under existing buildings and the underpinning problem is still further complicated by the necessity of constructing the subway under the present Washington Street Elevated structure and the overhead structure of the bus terminal.

In view of the above difficulties it was considered advisable to investigate the possibilities of departing from the alignment of the Legislative Route. Accordingly, alternate designs, drawings and

The state of the part of the control of the control

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In view of the above difficulties it was considered advisable

estimates of cost were made of an alignment which, instead of detouring back to Washington Street at Williams Street, extends continuously in Shawmut Avenue until it meets the original proposed right of way at Bartlett Street. This alternate alignment requires the construction of a new bus terminal and the demolition of the building leased by the Government for a post office, but despite these additional costs very substantial overall savings will result. The new alignment is also an improvement over that of the Legislative Route, from an operational viewpoint. This alternate alignment was developed by Mr. E. B. Myott, Superintendent of Engineering and Maintenance. Our engineering and cost studies bear out his good judgement in proposing this alternate.

Preliminary Field Work

After investigating the work which had previously been performed by others and conferring at length with the engineers of your Authority, field reconnaisance surveys were made by the principals of our office.

An instrument survey was then made of the entire section and the Plan and Profile was prepared on a long roll map.

A contract was awarded for borings at regular intervals through the area involved and logs of these borings were prepared. This work was supervised by our engineers. Types of soil as determined from the borings are indicated in the "Supplementary Drawings".

Subsequently, undisturbed samples obtained by the boring contractor were analyzed in a soils laboratory and the results were

and the second s Street at Williams Street, extends continuously in AN ARM TO REAL PROPERTY AND ARMST AN with the first and profession to the model of the first and the parties of the pa The same of the sa THE RESIDENCE OF THE PARTY OF T Description of the Control of the Co DATE OF ALL RESIDENCE OF A SECURITIES OF LINES WHEN THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER. tudies bear out his good judgement in proposing this alternate. the contract of the state of th - the control of the Above the Sylvenia reputations and their promitive the second of th nd Profile was prepared on a long roll map. appears where the state of the itese borin ts, Types sectionally extraorditions that the sections ples obtained by the boring yzed in a soils laboratory and the results were

tabulated and used in our foundation designs. A copy of the laboratory report was forwarded to your engineers.

A survey was made of all existing subsurface utilities throughout the entire right of way and record drawings were prepared showing the line and level of such utilities.

A survey was also made of all buildings on or adjacent to the right of way and from these data underpinning requirements were determined.

A real estate map was made from data obtained from city records and from our own surveys. These data were furnished to your real estate experts for their determination of condemnation costs.

Office Work

With the data obtained from the various sources noted above, alignment plans and profiles of the right of way were computed and drawn on consecutive sheets. These drawings show the tracks and other pertinent data. Similar drawings were prepared and furnished to your Engineering Department for their use in preparing track work, power, lighting and signal system drawings.

Simultaneous with the preparation of the alignment drawings, structural and architectural studies were made of the various component parts of the project.

During this phase of our work frequent consultations were held with your engineers and every effort was made to arrive at the best possible solution of all problems.

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Suggested Sequence of Construction Operation at Strategic Locations

The construction procedures at several locations are involved and difficult. Many studies were made and the following paragraphs outline the sequence at these locations:

- (A) Dudley Street Station
- (1) Legislative Route
- 1. Remove elevated west loop and supporting columns.
- 2. Where necessary, underpin remaining elevated columns.
- 3. Build subway, stairs and escalators from street surface down to subway lobby, and lower two flights of stairs from lobby to elevated bus loop platform.
- 4. Switch elevated train traffic into subway.
- 5. Provide temporary decking over a limited length of elevated

 Northbound track and temporary railing around a section of existing
 elevated platform and the above-mentioned temporary decking to
 facilitate the movement of passengers from the street surface to the
 bus loop platform.
- 6. Remove all remaining elevated structures and supports except the bus loop and facilities indicated in step 5 above.
- 7. Remove elevated waiting room and regrade south end of existing east elevated platform to same slope as the adjacent bus loop platform.
- 8. Install escalators and complete construction of stairway from lobby to bus loop platform.
- 9. Put in use the facilities constructed in step 8 above and remove the temporary facilities of step 5 above together with their supports and

the sequence at these locations:

- ful Street Star
 - (1) Legislative Route
- 1. Remove elevated west loop and supporting columns.
- 2. There exists an energies remaining alreaded versions,
- 5 Della callean, status and appear to a company to the status of the sta
 - 4. Switch elevated train traffic into subway.
 - 5. Provide temporary decking over a limited length of elevated

ted platform and the street surface to the aloop platform.

- Remove all remaining elevated structures and supports except the bus loop and facilities indicated in step 5 above.
- T. Remove alreaded walking come and engrade such and deliberation of the captured platform.
- E. Sestell escalators and complete confidence of stairway from 1987; in the loop platform.

stairways leading thereto.

- 10. Build new stairs and escalators from street to bus loop platform.
- 11. Remove remaining central stairs and supports from street surface to bus loop platform and construct new surface waiting room.
 - (2) Alternate Route
- 1. No difficult problems would be encountered if the alternate route were adopted.

(B) Northerly Connection

- 1. Complete the new structure between the Brookley Road and Boylston Street Connections.
- 2. Drive soldier beams on the West side of the new alignment from beam 125 to 166.
- 3. Excavate North to beam 145 from the soldier beams to the existing subway wall down to invert grade, and uncover as much of the existing subway roof as possible.
 - (a) Place sheeting, decking and bracing as excavation progresses.
- (b) Temporarily support East side of decking on the existing subway walls, columns and roof.
- 4. Construct the new invert from the existing West wall to the new West wall, and construct the new wall footing North to beam 145.
- 5. Construct the new West wall to beam 145.
- 6. Erect the new centerline columns and new West beams to 145.
- 7. Place temporary beams on top of the existing roof slab from the existing centerline columns to the new centerline columns to 145.

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- and escalators from street to bus loop platform.
- to bus loop platform and construct new surface waiting room.
 - smill abscride (5)
 - if duting present seeds by surgents the control of the control of
 - (B) Northerly Connection
 - 2. Camplete the saw structure between the birthist Brush and Saylabou Street Consections;
 - E Prive self or heart a rathe weet side of the see all marketon beam 125 to 166.
- in Englands Horse to be be decided and the subject to the extreme subject to the extreme subject to the extreme subject to the extreme subject to the extreme.
- 19) Plate monthing, deciding and by along an available programme
 - (a) Samporarily export Naar side of decking on the existing purpose of the existing purpose and coor
 - of the second line is a second level for the second second with a second second line is a second second line in the second line is a second line is a second line in the secon
 - 3. Construct the new West wall to beam 145.
 - to Erect the new contemps of themes and new Work burner to 185.
 - beams on top of the existing roof slab from the state of the state of the new centerline columns to 145.

- (a) Where necessary cut opening in the building foundation to admit beam and jack beam into position over the column.
- (b) Where necessary place supports to reinforce existing centerline columns.
- (c) Place the necessary "U" bolts from these beams to the existing roof beams near the existing West wall.
- 8. Shift decking supports to these beams where necessary.
- 9. Remove the existing West wall to beam 145.
- 10. Drive soldier beams from beam 167 to 210 on the West side and from 161 to 210 on the East Side.
- 11. Excavate North to beam 160 from the soldier beams to the existing subway wall down to invert grade and uncover as much of the existing subway roof as possible. Place sheeting and bracing as excavation proceeds.
- 12. Remove existing West roof beams and West wall from 146 to 160, and place decking in this area. Construct new invert and West wall to 160.
- 13. Place beams 146, 147 and 148 from the new West wall to the existing centerline girders.
- 14. Place temporary beams on top of the existing subway roof from the existing East wall to the new West wall from beam 149 to 160.
- 15. Place the necessary "U" bolts from these beams to the existing

 East roof beams near the existing center girders.
- 16. Shift the decking supports to these temporary beams where necessary.

- (a) Where necessary cut opening in the building foundation to admit beam and jack beam into position over the column.
- (b) Where necessary place supports to reinforce existing center-
 - (c) Place the necessary "U" bolts from these beams to the existing roof beams near the existing West wall.
 - 8. Shift decking supports to these beams where necessary,
 - 9. Remove the existing West wall to beam 145.
 - 10. Drive soldier beams from beam 167 to 210 on the West side and from 161 to 210 on the East Side.
 - 11. Excavate Worth to beam 160 from the soldier beams to the
 - sisting subway roof as possible. Place sheeting and bracing as ex-
 - 12 Manuary existing West roof beams and West wall from 146 to 160, and plant and West wall to 160.
 - 1). Place beams 146, 147 and 148 from the new West wall to the existing centerium girders.
 - 14. Place temperary beams on top of the existing above root from the existing East wall to the new West wall troop beam 149 to 140
 - is. Place the necessary "G" bolts from these noting to the extiting East roof beams near the existing center girders.
 - 16. Shaft the decking supports to these transcrary brams where a necessary.

- 17. Remove the existing centerline columns and girders from 150 to 160.
- 18. Excavate North to beam 210 on the West side and from beam
 161 to 210 on the East side. The excavation shall be to invert grade on
 the sides and to the existing subway roof. Place sheeting and bracing as
 the excavation proceeds.
- 19. Remove the existing roof, center columns and West wall from beam 161 to 210. Place decking.
- 20. Remove the existing East Wall from beam 161 to 185.
- 21. Construct remainder of new invert from the existing West wall line to the new West wall line and the wall footing. Also construct the new West wall to beam 210.
 - (a) Extend the ventilation duct.
- 22. Install the new track on the new alignment with a minimum of interference with traffic, and detour traffic to the new alignment.
- 23. Construct the new East wall from 125 to 185, and connect the new East wall to the old East wall near beam 160.
- 24. Burn off the portions of the old West beams, from 125 to 145, that extend beyond the center of the new East wall.
- 25. Erect the new East beams and construct the roof to beam 145.
- 26. Burn off the portions of previously placed beams 146, 147 and 148 that extend beyond the center of the new East wall.
- 27. Burn off the portions of the old East beams from 149 to 160 that extend beyond the center of the new East wall.
- 28. Erect new roof beams 149 to 210 and construct the new roof.

- 13 Meaning the causing tree all makes gritues the country that
 - 1. Excavate North to beam 210 on the West side and from beam
 - and what the training the Code of the companies and the first and made on the code to
- the abdeau and to and reliefling relieves such in Place election and been up an
 - the except matter action of
 - 19. Remove the existing roof, center columns and West wall from beam 161 to 210. Place decking.
 - 20. Remove the existing East Wall from beam 161 to 185.
 - It will uct remainder of new invert from the existing West wall
 - here is the west wall line and the wall footing. Also construct the new West wall to beam 210.
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 - the first the new East beams and construct the roof to beam 145.
 - de. Bure of the parties of previously classed hears like, 147 and
 - les tres var in the corporation and the case and the
 - 27. Burn off the portions of the old East beams from 149 to 160 that extend beyond the center of the new East wall.
 - 26 Received and the face of the different state of the different state and the

- 29. Repair building foundation damaged during construction.
- 30. Remove bracing, temporary beams and supports. Backfill, remove decking and place temporary pavement.

(C) Southerly Connection

- 1. Support existing bents 823 to 826 incl. by means of temporary girders, struts and columns on timber grillages.
- 2. Remove existing footings under bents 823 to 826 incl. and replace with new footings.
- 3. Reinforce existing columns 823 to 826 incl. by welding a 3/4 x 15" plate to each column flange.
- 4. Attach reinforced columns to the new footings and remove the temporary supporting members.
- 5. Extend bent 826 as shown.
- Erect new West stringer between bents 823 to 825.
 Erect two Westerly stringers between bents 825 and 826.
 Erect four stringers between bents 826 and 827.
- 7. Erect framing as shown.
- 8. Lay tracks on the new alignment and reroute trains.

Suggested Division of Construction Contracts

The entire work involves as estimated total construction cost exceeding \$ 28,000,000. This is considered too large for construction under a single contract. We consider it inadvisable to divide the work into a large number of relatively small contracts but are of the opinion that the work should be divided into not less than four prime

- 77. Kepair bulling luminition domaged houng construction.
- 30. Remove bracing, temporary beams and supports. Backfill, remove decking and place temporary pavement.

(C) Southerly Connection

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Saggested Divinion of Guardenstein, Suntraction

The entire work involves as estimated total construction cost example. The entire work involves as estimated total construction cost example. The entire product of the entire p

general contracts.

The following divisions separate the contracts into similar types of construction:

- 1. From existing Boylston Station to Dover Street (2, 800' +)
- 2. From Dover Street to Lenox Street (4, 800' +)
- 3. From Lenox Street to end of incline at Ritchie St. (7,700' +)
- 4. From end of incline at Ritchie St. to Forest Hills (7, 400' +)

Basis of Design

The following design criteria have been used in our

Preliminary Phase computations and are also suggested for use in

the Plan Phase. Where applicable they are similar to those recommended and approved for the Tremont Street Subway but they have been amplified to provide for special features of this project. In the final design conditions may arise which are not foreseen in standard codes.

Such conditions may require amplification or modification of these requirements.

(A) Codes

1. In the execution of the contract entered under these specifications, the following codes, as amended to date, shall apply except as herein specified or modified.

Structural Steel - General A. I. S. C.

Structural Steel - Special A. R. E. A.

Structural Steel - Special A. A. S. H. O.

Timber As specified

Concrete A. C. I., Joint Committee

Code

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Basis of

The following design criteria have been used in our design criteria have been used in our design our standard or secretarion where explicitly there exists the secretarion of the secret

(A) Codes

1. In the execution of the contract entered under these

Timber As specified

Concrete A. C. I., Joint Committee

(B) Loads and Forces

1. Dead and Live Loads:

a. The dead load shall consist of the weight of the structure complete, including all material permanently fastened thereto or supported thereby.

(1) Cover loads in these specifications is meant to be the combined weight of the roof construction (beams, slab, etc.) and the overlying earth.

b. Live load shall consist of any uniform or concentrated movable load which may be displaced either by reason of operation or any other cause.

(1) The load on elevated and subway tracks shall be taken as a single or continuous train of rapid transit or trolley cars with axle loads of the amounts and spacings given in tables 1 and 2 respectively.

Axle Load (Kips) 35 35 35 35

Spacing (Feet) 8.83 6.83 37.75 6.83 8.83

Table 1.

Axle Load (Kips) 25 25 25 25

Spacing (Feet) 8.33 6.06 26.29 6.00 8.33

Table 2.

(2) Where the structure supports railroad trains, the design shall be made in accordance with the requirements of the railroad company concerned, but in no case shall the loading be less

care the manager of 181

i. Dead and Live Loads:

- a. The dead load shall consist of the weight of the
- structure complete. Including all material sermanusky darbered thereto, or supported thereby.
 - (1) Cover loads in these specifications is meant to
 - - (1) The load on elevated and subway tracks shall be salers as a single or continuous track of reput tracks or trolley corn with sale lastest the amounts not spurite, given in tables a and same separations.

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Spacing (Feet) 8.83 6.83 37.75 6.83 8.83

Table 1.

Axle Load (Kips) 25 25 25 Spacing (Feet) 8.33 6.00 26.29 6.00 3.33

Table 2,

(2) Where the structure supports railroad trains,

than that recommended by the American Railway Engineering Association.

- (3) The live load from sidewalks over subways shall be taken at 600 pounds per square foot.
- (4) The live load from roadways over subways shall be computed by one of the following methods. Whichever method causes the higher stress shall be used.
- (a) For a cover of 2 feet the live load shall be taken as 1,300 pounds per square foot of roadway surface, decreasing by 100 pounds per square foot for each additional foot of cover up to 9 feet. At 9 feet of cover the live load becomes 600 pounds per square foot and remains at this value for all covers exceeding 9 feet.
- (b) The live load shall be taken as a local concentration of 200 kips on four wheels, 12 feet between axles and 6 foot gauge. Each of these wheel loads shall be considered distributed over an area of 2 feet by 2 feet on the pavement and then through the soil and roof at a slope of 1 horizontal to 2 vertical.
- (5) The live load, in lbs. per sq. ft., on other surfaces of subway and elevated structures shall be assumed as follows:

Canopy Roofs	30
Service Walks	150
Platforms and Mezzanine Floors	150
Stairs, on horizontal projection	150

One-half the above values shall be used for the design of elevated columns.

than that reterrornied by the American Belivar Degravering Associations

- (3) The live load from sidewalks over subways shall be taken at 600 pounds per square foot.
- (4) The live load from roadways over subways shall be computed by one of the following methods. Wnichever method causes the higher stress shall be used.
 - (a) For a cover of 2 feet the live load shall be interested as 1,100 points again from a substantial formal standard and shall be covered to the first of the total standard from all the standard per standard from the standard per standard from the standard per standard from the sta
- (b) The live load shall be taken as a local concontract of the second shall be taken as a local confeet gaser. Letted there when the second shall be taken the second shall be taken to a stope of 1 horizontal to 2 vertical.
 - (5) The live load, in lbs. per sq. ft., on other

Canopy Roofs
Service Walks
Platforms and Mezzanine Floors

150

One-half the above values shall be used for the design of

and resident of the resident

Floors of Maintenance and Service Rooms, Duct Manholes	150
" Dispatchers', Trainmen's and Motormen's	
Quarters of the latest the second sec	200
" Third Railmen's and Trackmen's Quarters	200
" Battery Rooms " The Battery Rooms	200
" Signal Towers Signal Towers	200
Transformer Closets	200
Control Roomis	300
" Cfreuit Breaker Rooms	400
" Compressor Rooms	500
" Sump and Pump Chambers	500
Storage Spaces in Subways	500
Floors of Fan Chambers	600
Floors of Rectifier Rooms	800

2. Building Load

- a. When the subway passes under private property, it shall be designed for "Building Load". Each case shall be considered on its own merits.
- b. A reduction of the total live load to be assumed as affecting subways shall be permitted according to the following schedule.* No reduction shall be allowed in the roof load.

Per Cent Live Load Reductions

Occupancies for which prescribed Live Load per Square Foot is -					Stories is - 6 or more
125 pounds or less	15	20	30	40	50
Over 125 pounds, except garages	5	10	15	20	20
Garages, all classes	25	25	25	25	25

c. Buildings up to 6 stories in height shall generally be designed for a uniform load. For buildings in excess of 6 stories, future building columns shall be fixed beforehand and grillages provided in the subway roof construction for their support.

^{*} From Building Code of the City of Boston.

150	Maintenance and Service Rooms, Duct Manholes	to a	Floor
	Buguanas', Trillanss's and Melarrent's		34
0.03	ERREIG		
801	Track Ballingon's and Trackment State Byld's		
	Rathery Recents		11
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- a. When the subway passes under private property, it shall be designed for "Building Load". Each case shall be considered on its own merits.
 - b. A reduction of the total live load to be assumed as affecting subways shall be permitted according to the following schedule. * No reduction shall be allowed in the roof load.

Per Cent Live Load Reductions

	Occupanci Load per School Live Load per School Live Load per School Live Load per School Live Live Live Live Live Live Live Live			or to d	
	part or showing \$1.1	- 91	g m	40 50	
¥	Over 125 pendag samely (Althor)	<i>i</i>	E1 01	05 05	
	Garages, all classes .	25 2	25 25	25 25	
	c. Buildings up to 6 stories in hei	ht sha	all gen		
designed fo	for a uniform load. For buildings is	exce	ess of	<i>,</i> , , , , , , , , , , , , , , , , , ,	
liud statat	ilding columns shall be fixed before	and a	and gri	lages	
el belovery	subway roof construction for	beir s	suppor	1	
a Prome Do	unum.g Code of the				

35.

- d. Special conditions may arise which, if the general rules of sub-section "c" above were rigidly adhered to, would cause undue restriction in locating future building columns. In such cases the subway may be designed for a uniform load irrespective of the height of the building to be supported, provided that the building load can be satisfactorily distributed at the bottom of the subway for all reasonable column locations.
- e. Where building locations and loads have not absolutely been determined, the following procedure shall be followed. The footing supporting piers and columns shall generally be assumed to be spread over an area equal to one-half that of the corresponding panels. The load transmitted to the subway roof shall then be taken as equal to twice the total from roof and floors as determined from subsection "b" above. The following additional loads shall be superimposed on this load, which is assumed to be applied to every square foot of subway roof.
- (1) Dead weight of front wall: This load shall be considered spread over a strip 4 feet wide, of which I foot is outside the building line. Where the subway roof is less than 10 feet below the street surface, the load shall be considered spread over a strip 3 feet wide, flush with the building line. Where buildings are in excess of 6 stories in height, the width of the strips referred to above shall be increased by being extended to the middle of the end panel.

- d. Special conditions may asist which United prestil tills of sub-section "r" there were rightly address to real exerce which restricted to the condition of th
 - Seed on learning the ledge of the sound to be settly been sound to be settly been sound to be settly been sound to be seed to be see
 - (1) Dead weight of front wall: This load shall be considered and the product of the considered wall with the considered with the considered with the considered was the considered with th

- (2) Dead weight of lot line walls: These loads shall be considered spread over strips 3 feet wide, flush with lot lines.

 Where buildings are in excess of 6 stories in height, the width of the strips referred to above shall be increased by being extended to the middle of the end panel.
- (3) The weight of the subway roof and overlying soil shall be taken at 100 pounds per square foot for every foot between the cellar floor level and the underside of the transverse roof members. Where the subway roof is below water, 25 pounds per square foot shall be added for every foot of ground water head above the top of the roof.

3. Side Pressure on Subways:

- a. The subway shall be designed for side pressure due to earth abutting against the subway wall, loads resting on abutting earth, and water producing hydrostatic pressure.
- b. In designing for overlying loads, the following shall be adhered to:
- (1) Street live load shall not be included when calculating loads from footings or earth.
- (2) Floor loads shall include live loads. The live load on track floors shall be taken as 450 pounds per square foot.
- (3) When an overlying foundation is not continuous longitudinally, the load shall be considered distributed over a length equal to the length of the foundation plus twice the transverse

- (2) Dead weight of lot line wails: These loads shall be carsulated appeared over the product of the carsulated appeared of the end panel.
 - (3) The weight of the subway roof and overlying set and the subway roof and overlying set and the stand overlying set and the stand of the standard of the sta

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- a. The subway shall be designed for side pressure
 - b. In designing for overlying loads, the following shall be adhered to:
 - calculating loads from footings or earth.
- (2) Floor loads shall include live loads. The
- thurse length of the roundation plus twice the transverse

distance from the net line of the lower wall to the near edge of the foundation. However, in no case shall the increased length exceed the longitudinal distance between centers of adjacent foundations.

- c. A minimum side pressure of 200 pounds per square foot shall be used for walls in earth near the street surface.
 - d. Side pressure due to water shall be considered.
- e. Where the active side pressures against opposite sides of a structure in earth are unequal, the greater pressure shall be considered for both sides.

4. Impact

Impact effects shall be accounted for by designing members for additional forces whose magnitudes are to be determined according to the respective code. In general, impact for subway trains shall not be less than

$$I = 150 - L \frac{\overline{6}}{450 + L}$$
 100 (1)

where I = increase in percent of the live load on a single track
and L = length of span in feet.

For members supporting several tracks, such as cross girders and columns, L = length of adjacent spans for one track only.

Where a member supports more than one track, the number of tracks assumed loaded shall be such as will produce the maximum stress in the member, but the impact increase shall be

distance from the set tion of the lower wall to the wear edge of the townships. However, to be case that! the interpolate of tenth entred the longitudinal of these between senters at adjacent fundations.

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Intest effects shall be accounted for the darking of the delignment of the adultions are to be deligned in accounting to the respective code. In general, impact for saving trains shall not be less than

$$I = 150 - L$$

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where is sucrease to percent of the five book to a copie brook

and L = length of span in feet.

For minuters supporting several bucker, such activines gladers and cultumns, it a langth of adjaceth space for mentionally.

Thurst and the state of the desirable services about the recommendation of their services as the services as t

applied only to that track which when loaded contributes most to the live load stress.

For trolley cars and railroad trains the values yielded by the formula given above shall be multiplied by 3.

5. Lateral Forces on Elevated Structures.

- a. Wind force shall be computed at 30 p. s.f. of vertical projection of exposed surface. For two track structures the exposed surface of one train shall be considered. The wind force on trains shall be considered as applied six feet above Base of Rail. Where wind screens at platforms are considered as part of the exposed surface, the wind force on one train may be disregarded, provided the wind force on the screens is greater than that on one train.
- b. Tractive force shall be computed as ten percent of the weight of the train uniformly distributed along the length of the train and shall be assumed to stress the columns resisting such tractive force in bending only. All columns between expansion joints in a single line parallel to the track shall be assumed to resist an equal amount of the tractive force, except that where there is a considerable difference in the stiffness of columns, the force resisted by each column shall be assumed to be in proportion to its stiffness which is defined as moment of inertia divided by length.
- c. Centrifugal force shall be computed through use of the following formula:

applied only to that truck which when leaded contributes more to the

For trolley cars and salisman tasks the values yielded by the formula given above shall be mediliphed by t.

5. Laboral Forces on Marales Prescious.

a. Wind force shall be computed at 30 p. s. f. of

restical projection of exposes surface. For swederic alrestures
the exposed sariage at any until se considered. The rest instruct
entrains similar considered as appoint six that above base of Sali.
Where with recens at pictions are encoldered as part of the expassed surface, the rest force as one train may be disregarded,
provided the wind force on the secreans is greater than that on one
provided the wind force on the secreans is greater than that on one

of the weight of the train uniformly distributed along the length of the train and shall be assemed to stress the columns replating out the trainty force in heading only. All columns between expanding points in a single line parallel to the track shall be assumed to resist an equal amount of the track shall be assumed to there is a considerable difference in the satisfices of unionne, the force satisfices of unionne, the force satisfices of unionne, the force satisfices which is defined as moment at latertia divided by length.

c. Centrifued force stall as computed through use of the following formula:

(2)

Where: F = Centrifugal Force

C = Coefficient depending upon degree of curvature as per table below

W = Weight of train per foot

			_			gree of Rad	
1 1 1 1 1 1	5,730	0.020	2 . 8	er. 3 717 .	0.120	15 383	0.120
2	2, 865	0.040	9	637	0.126	16 359	0.112
3	1,910	0.060	10	574	0.130	17 39 338	0.102
4	1,433	0.076	11	522	0.132	18 320	0.090
5	1, 146	0.090	12	478	0.132	19 303	0.076
6	955	0.102	13	442	0.130	20 288	0.060
7 . : 1	819	0.112	14	410	0.126		

Centrifugal forces shall be neglected for curves of less than one degree, while for curves exceeding twenty degrees the value of C shall be taken as 0.060.

d. Provision shall be made in designing steel structures for a variation in temperature from -10 to +110 degrees Fahrenheit, and, in designing masonry structures such as viaduct arches, for a variation from +20 to +80 degrees Fahrenheit.

(C) General Design Procedure

- 1. Roof beams, girders and columns shall be designed for full uniform load and for any additional concentrated load as determined from design.
- 2. Exterior columns supporting side walls shall be designed for the combined stresses due to the horizontal earth pressure (and water and surcharge, if any) and the direct axial load. The columns shall be designed as follows:

Where: F = Centrifugal Force

curvature as per table below

W = Weight of train per foot

0	in Ft.	egree of	C	Radius in Ft.	Degree of Curvature		Radius in Ft.	Degree of Curvature
0.120	383	15	0.120	717	8	0.020	5,730	ſ
0.112	359	16	0.126	637	6	0.040	2,865	S
0.102	338	17	0.130	574	10	0.060	1,910	3
0.090	320	18	0.132	522	11	0.076	1,433	4
0.076	303	19	0.132	478	12	0.090	1, 146	5
0.060	288	20	0.130	442	13	0.102	955	9
			0.126	410	14	0.112	819	7

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shall be taken as 0.060.

d. Provision shall be made in designing steel structures

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and, in designing masonry structures such as viaduct arches, for a variation from +20 to +80 degrees Fahrenheit.

(C) General Design Procedure

1. Roof beams, girders and columns shall be designed

determined from design.

2. Exterior columns supporting side walls shall be

designed for the numbered stressis in the bresteadilly out?

tring front out the few H regardress has seen had emesses.

load. The columns shall be designed as follows:

a. When the direct load P does not exceed 150 kips, one half the load is assumed to be carried by the concrete wall and the other half by the column and the maximum allowable steel stress due to combined direct load and bending is 25 kip per sq. in. For P \geq 150 kip, the permissible bending stress is thus

$$f_{B1} = 25 - \frac{P}{2A} \tag{3}$$

b. As the direct load P increases beyond 150 kip, gradually less of it is assumed to be carried by the concrete wall, until, when P reaches the maximum value of f'DA, the concrete is disregarded, and the maximum allowable stress due to the combined direct load and bending is 20 kip per sq. in. For the latter condition, the permissible bending stress is thus:

$$fB2 = 20 - f'_D$$
 (4)

c. Between the limits defined by a. and b., a straight line interpolation shall be used for determining the permissible bending stress. For 150<P<f'DA the permissible bending stress is thus:

$$f_B = f_{B2} + (f_{B1} - f_{B2}) \frac{f'_DA - P}{f'_DA - 150}$$
 or (5a)

$$f_B = (20 - f'D) + (5 + f'D - 150) \frac{f'DA - P}{f'DA - 150}$$
 (5b)

Where:

A = Area of column section in sq. in.

P = Total direct load in kip.

f'D = Maximum allowable direct stress in kip per sq. in.

are the direct load P does not ensured 150 kips, one

built like look in a second to be rearded by the concrine wall and the concr built apith, and the concrete wall and the concrete wall and the reasonable and the continue in 25 like par equal. For P g 150 kip, the permissible bending stress is thus

$$f_{B1} = 25 - \frac{P}{ZA} \tag{3}$$

b. As the direct load P increases beyond 150 kip,

gradually bear at the accumulation of carried at the control will,

and the permissible bending stress is thus:

$$fB2 = 20 - f'D \tag{4}$$

c. Between the limits defined by a. and b., a straight line interpolation that the production of the straight pending straight and the straight straight straight.

$$f_{\mathbf{B}} = (20 - f'_{\mathbf{D}}) + (5 + f'_{\mathbf{D}} - 150) f'_{\mathbf{D}} A - P_{\mathbf{D}}$$
 (56)

Where:

A = Area of column section in sq. in.

P = Total direct load in kip.

f'D = Maximum allowable direct than the state of the stat

- fB1 = Maximum allowable bending stress in kip per sq. in. for P = 150 kip.
- $^{f}B2$ = Maximum allowable bending stress in kip per sq. in. for P = f'DA.
- fB = Maximum allowable bending stress in kip per sq. in.

 for 150 < P < f'DA
- d. Side wall columns shall be investigated for the effects of eccentricity by utilizing the following:
- (1) Where a roof member bears on the inside flange of a column, the total stress in the flange due to axial and bending stresses may not exceed 20 kip per square inch. The moment due to eccentricity shall be computed as the load multiplied by:
 - 0.5 column depth when roof member is a girder

 0.4 " beam with stiffeners

 0.3 " without stiffeners
- (2) When eccentric cantilever footings are used, the sum of stresses on the inside column flange shall not exceed 20 kips per square inch, except where the inside column flange is imbedded in concrete for a height of at least one-fourth of the span in accordance with section D. 1. (7)(a), in which case the allowable stress may be raised to 25 kips per square inch. The moment shall be taken as load multiplied by the distance between the center line of the column and the center of the footing.
- 3. Subway inverts distributing loads over the entire subgrade shall be designed for their total load as determined from design,

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but in no case shall inverts of this type be designed for a total load of less than 900 pounds per square foot.

- 4. Grillages, base slabs and footings shall be designed for their total load as determined from design.
- a. Grillage beams shall have sufficient flange bearing area, considering both flanges, to transmit safely the superimposed load to the concrete at the allowable unit bearing stress. The clear distance between flanges of grillage beams shall be not less than 2-1/2 inches.
- b. Grillages shall be designed to resist moment, shear and full bearing under the column. Web buckling shall not be considered when the beams are encased in concrete and the load is applied after the concrete has set.
- c. Grillage beams shall have a depth of not less than 6 inches or a length of not less than 18 inches.
- d. In general, concrete or steel grillage footings may be used for isolated subway footings with a total column load not in excess of 100 kip. When the total column load exceeds 100 kip, grillages shall be used.
- 5. Elevated steel column bases and their supporting grillages, if any, shall be designed for the same combinations of forces as are specified for elevated columns in section D. 4. d and B. 5. Since the highest stresses are generally produced through the combined action of direct load, wind, traction, and centrifugal

but in no case shall inverts of this type be designed for a total load of less than 900 pounds per square foot.

- 4. Grillages, base slabs and footnigs shall be designed for ir total load as determined from design.
- a. Grillage beams shall have sufficient flange bearing

 a, considering both flanges, to transmit safely the superimposed

 d to the concrete at the allowable unit bearing stress. The clear

 ce between flanges of grillage beams shall be not less than
- b. Grillages shall be designed to resist moment, shear all bearing under the column. Web buckling shall not be coned when the beams are encased in concrete and the load is
 - c. Grillage beams shall have a depth of not less than
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force (on curves), the allowable stresses for such design shall be increased 25 per cent.

6. All concrete structures shall be designed in accordance with the requirements of the American Concrete Institute or Joint Committee Code. In cases of discrepancy, the Joint Committee Code shall govern.

(D) Allowable Stresses

The following unit stresses in kips per square inch shall govern the design of all members as mentioned in Section A. (These unit stresses are tentative and are subject to future revision.)

1. Structural Steel, Rivets, Bolts, and Weld Metal

a. Tension, net section:

Structural shapes	20
Welds	13

b. Compression:

Members in which L/r	3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
	20-0.095 ^L /r*
but not to exceed	1
Elevated columns	18.5-0.09 ^L /r*
but not to exceed	4. ph. s. ph. sc. ph. s. ph. s. ph. s. 15
Welds	1. [1] [1] [1] [1] [1] [1] [1] [1] [1] [1]

c. Bending, extreme fibre:

Structural shapes except as noted

in subsections (3) and (7) to (11) 20

*The value of L/r shall not exceed 100 for main members or 150 for secondary members including bracing.

force (on curves), the allowable stresses for such design shall be increased 25 per cent.

6. All concrete structures shall be designed in accordance

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The following unit stresses in kips per square inch shall

so as the same at the same as the same as the same at the same and are subject to future revision.)

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- a. Tension, net section:
- Structural shapes 20
- Welds 13
 - application of the contract of
- Members in whichile 3
- Subway columns: 20-0.095L/r*
 - but not to exceed 16.5
- Elevated columns 18.5-0.09L/r*
 - but not to exceed 15
 - Welds 15

c. Bending, extreme fibre:

ructural shapes except as noted

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	Pins, turned bolts	30
d.	Bearing:	
	Structural shapes	20
	Pins, turned bolts and shop rivets	30
	Field rivets, power driven	25
	Rollers, kip per lineal inch	0.75d
e.	Shear:	
	Webs, gross section except as noted in	
	subsection (3)	12.5
	Pins, turned bolts and shop rivets	15
	Field rivets, power driven	12,5
	Welds, kip per lineal inch:	
	1/4" nominal size	2
	3/8п д н д д п	3
	1/2**	4
	5/8" " "	5

- (1) For temporary work use stresses in Section F.
- (2) Rivet holes and isolated holes up to 1 inch in diameter shall not be considered as reducing the web area for resisting shear.
- (3) At copings and re-entrant cuts the allowable unit stresses for shear and bending shall be reduced to 10 and 15 kips per square inch, respectively.
- (4) The allowable unit stresses for special steels shall be higher than those given for steel in proportion to the minimum ultimate tensile stresses.

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nd Units el	(4) The allowable unit streams for agental stee
ATLANT C	higher than those given for alsed in seaporth-s in the min
	unimate tresses.

- (5). The allowable unit stress in shear shall be used for rivets stressed in tension only if the connection is symmetrical, and one-half of this value if the connection is unsymmetrical. Where rivets are subjected to shear and tension, the tensile component shall be considered to be a shearing force of twice the amount. Ordinary framed end connections are excepted.
- (6) Where the subway is to be designed for building load, it shall be designed in accordance with pertinent Building Code stresses unless those unit stresses specified herein are lower.
- (7) The allowable bending stress in structural steel may be increased to 25 kips per square inch where concrete may be counted on to act integrally with the steel. (Note exceptions in subsection (8) below.) This applies to:
- (a) Beams and girders having their compression flange embedded in a flat slab which extends in depth at least 1/3 the distance to the extreme tension fibre, and in width at least 1/2 the depth of the member beyond both flange members.
- (b) Beams and girders encased between subway roof arches.
- (c) Longitudinal mezzanine and platform roof members with other members framed into them on both sides and having their compression flange embedded in concrete for a width as specified above.
 - (8) No increase in bending stress shall be allowed for:

- (5). The allowable unit stress in shear shall be used for rivers stressed in tension only if the counsellung synchrical river over helf of the value of the counsellung in the counsellu
 - (6) Where the solvesy is to be destroyd for building late, it shall be damped in accoming a with perlinent Building C sin stresses unless thus woll stresses appointed heroid are lower.
 - (7) The allowable broking sures in discincial standard por target and the property of the property with the standard (Now recepture to subsection (8) below.) This applies to:
 - (a) Beams and girders having their compression flange embedded in a slat slate which extends in depth at least 1/3 the distance to the extreme sension fibre, and in where at least 1/1 the depth of the sneedless inventors their standards.
 - (b) Best cand picters succeed between verseaver roof arches.
 - (c) Longitudinal merzanine and platform roof

 Leaders with other members frame. It is them on both sides to

 Lorizontals conspections flatte and secretaring the a with the

 specified above.
 - (6) Ho increase in bending stress shall be allowed for

Roof members located between building lines of intersecting streets where the top of the subway roof is less than 7 feet below the street surface.

Members placed closer center to center than the sum of depth and flange width.

Members having a nominal depth in excess of 36 inches.

Rectangular sections stressed in shear and bending,

such as web plates extended longitudinally beyond flanges of girders.

- (9) When special steels are used, the additional bending stress allowed due to concrete embedment may be 5 kips per square inch, subject to the exceptions noted in subsection (8) above.
- (0) Where the ratio of the unbraced length of compression flange of beams and girders to the flange width exceeds 16, the allowable compressive stress shall be in kips per square inch = 25 0.31 L/w where L = unbraced flange length in inches and w = flange width in inches.
- (11) For beams and girders, where the ratio of span to depth exceeds the factor (k) which is 12 for members supporting tracks and 20 for all other members, the allowable bending stress shall be reduced to = $f k \frac{d}{L}$ where f = original bending stress, k = appropriate constant as mentioned above, d = depth of member in inches and L = span length in inches.

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- gulines cannilità est para la constitución de la litera e est (C)

 estaga seg agis e es yara la embadana el cance de est basolla espeta

 estaga seg agis e el constitución de estaga en es
- july Where the ratio shifts white exceeds 10, the allowliangs of neutral and address to the lians; with exceeds 10, the allowshie commenciate shifts what we had no hope per agrains then a the shift in
 white the command through the principal and as there willings
 inches.
 - (19) For meaning a literary where the ratio of star in depth exceeds the factor (k) which is 12 for members supporting tracks and a star of the ratio of the rati

2. Timber

	-	Leaf	White Pine, Spruce	Oak
Bending extreme fibre:	1.6 %, [1. 25	. 4 1. 25	1.40

Compression, parallel to grain:

The stresses given are for green timber and shall be used without increase of live load stresses for impact.

For building and similar structures in which the timber is protected from weather and is practically free from impact, the stresses may be increased 25 percent.

3. Allowable bearing values for soils in kips per square foot.

Sound ledge rock 60 to 150	
Hardpan or compact gravel 20	
Coarse sand or gravel a few and a part of the 12	
Clean sand or dry clay	
Clay, moist again the graph of the graph of the up to 4	

The above values are subject to change due to existing conditions.

*For long continued loading the Modulus of Elasticity shall be reduced to 50 percent of the above values.

radomi'T f

Oak	White Pine,	Leaf	~	
1.40	1. 25	1. 25	1.6	Bending extreme fibre:

Compression, parallel to grain:

$\frac{(-1+1)A+(-1+1)}{4BA}B+1$	$\frac{1-1}{200}$ $\frac{1-1}{1000}$ $\frac{1-1}{1000}$	21 C 1 L 2 203
0.94 1.20	1. 2 0. 94	for L/d \(\frac{15}{2} \) 15
0 40 8.50	105.0 46.0	stary of relations, required
0.09 0.14	0.15 0.15	Shear
1, 200 1, 200	1,500 1,500	Modulus of Elasticity*

The stresses given are for green timber and shall be used without increase of live load stresses for impact.

For building and similar structures in which the unions is projected from wentber units gracultally like from highest, the stresses may be increased 25 percent.

4E	Allegable Searing eilare for saile	and stages and east
	Sound ledge rock	60 to 150
	Hardpan or compact gravel	20
	Coarse sand or gravel	12
	Chesa sand as day class	8
	Clay maigt	Actou

The above values are subject to change due to existing

conditions.

The reag could be above values.

4. Combined stresses:

- a. Interior subway columns, in which compression and bending stresses due to side thrust are combined, shall be designed for a unit bending stress $\frac{Mc}{I} = 20 \frac{P \times 20}{A}$, where f'd = allowable direct load stress in kips per square inch from the column formula given in section 1, with a maximum of 16.5, P = direct load in kips, P = area of column section in square inches, P = actual bending moment, and P = section modulus. The effect of eccentric loading on interior columns may be neglected.
 - b. For subway side wall columns see section C2.
- c. Compression due to side pressure shall be neglected in the design of roof and invert members. Side pressure shall be considered in designing intermediate floor beams which shall be designed as follows:

When the beam meets the requirements of subsection 1 (7), assume one-half the direct side pressure as being taken by the beams and allow a combined bending and direct stress of 25 kips per square inch. In all other cases, assume the beams to take full side pressure and allow a combined stress of 20 kips per square inch. (See subsection 1 (11).

d. For Elevated Railway Structures, the following allowable stresses shall apply:

(1) Stringers:

When considering D only - Values given in

d. Cominged courses.

- a. Interior subway columns, in which compression and
- Angles of links Industrial are terrillable of which is policied and and analysis of the designed in a sum of the college of th

direct load stress in kips per square inch from the column formula given in section 1, with a maximum of 16.5, P = direct load in kips,

A = area of column section in square inches, M = actual bending moment, and I = section modulus. The effect of eccentric loading on interior columns may be neglected.

- b. For subway side wall columns see section C2.
- c. Compression due to side pressure shall be neglected in the design of roof and invert members. Side pressure shall be considered in designing intermediate floor beams which shall

When the beam meets the requirements of subsection 1 (7), assume one-half the direct side pressure as being taken of 25 kips per square inch. In all other cases, assume the beams to take full side pressure and allow a combined stress of 20 kips per square inch. (See subsection 1 (11).

d. For Elevated Railway Structures, the following allowable stresses shall apply:

(1) Stringers:

When considering D only - Values given in

Section 1.

When considering P only - Values given in Section 1 increased by 25 per cent.

- (2) Cross Girders Values given in Section 1. (The effects of wind and centrifugal force shall be disregarded.)
- (3) Columns

When considering P only - Values given in Section 1.

- " P and Th 20 kip per square inch.
- P, W_h and C_h 20 kip per square inch.
- " P, Wh, Ch, and Th 25 kip per square inch.

Where:

D = Direct load (live load + dead load + impact).

W = Vertical force due to wind.

C = Vertical force due to centrifugal action.

P = D + W, with rails properly superelevated = D + W + C, where no superelevation is provided.

Wh= Horizontal force due to wind.

C_n = Horizontal force due to centrifugal action.

The = Horizontal force due to traction.

(E) Waterproofing

Subway structures shall be waterproofed as follows:

- 1. Invert: 6-ply waterproofing and 4" concrete.
- 2. Roof:
 - a. Above ground water level:
 - (1) At stations: 4-ply waterproofing and 4" concrete.

- is a considering P only Values given in Section 1 increased by 25 per cent.
 - Cross Girders Values given in Section 1. (The effects of wind and centrifugal force shall be disregarded.)

111 (0.000)

When considering P only - Values given in Section 1.

- " P and Th 20 kip per square inch.
 - n n P, Wh

and Ch - 20 kip per square inch.

" P, Wh, Ch, and Th - 25 kip per square inch.

Where:

D = Direct load (live load + dead load + impact).

W = Vertical force due to wind.

C = Vertical force due to centrifugal action.

D - D + W, with reils properly superclowed.

where no superclevation is provided.

Wh= Horizontal force due to wind.

On a Hardasonial torse that as centralingal service,

Th = Horizontal force due to traction.

Matter (A)

Sulway structures shall be waterproofed as follows:

- . Invert: 6-ply waterproofing and 4" concrete.
 - times is

stations: 4-ply waterproofing and 4"

- (2) Between stations: 3-ply waterproofing and 4" concrete.
- b. Below ground water level:
 - (1) At and between stations: 4-ply waterproofing and 4" concrete.

3. Sidewalls:

- a. Above approximately 12 feet below ground water level:
 4-ply waterproofing and 4" concrete.
- b. Below approximately 12 feet below ground water level:6-ply waterproofing and 4" concrete.

(F) Loads and Stresses for Decking and Temporary Work

1. Loads:

- a. The dead load shall include the weight of all structures fixed in location for the life of the decking.
- b. The live load shall be computed in either of the following ways:
- (1) 200 pounds per square foot over the entire area of sidewalks and roadway.
- (2) A local concentration of 20 kips on one axle with a 5 foot wheel gauge.
 - (3) For trolley cars as specified in section B.
- (4) Loading due to construction equipment shall be substituted where such loading is in excess of the above.
 - 2. Allowable unit stresses in kips per square inch.

a. Steel:

(1) Tension, net section

- (2) Between stations: 3-ply waterproofing and 4" concrete.
 - b. Below ground water level:
- (1) At and between stations: 4-ply waterproofing and 4" concrete.

3. Sidewalls:

- a. Above approximately 12 feet below ground water level:
 4-ply waterproofing and 4" concrete.
- b. Below approximately 12 feet below ground water level:6-ply waterproofing and 4" concrete.

17 Looks and Streeter for Docting and Temporary Policy

ing k

- a. The dead load shall include the weight of all structures fixed in location for the life of the decking.
- b. The live load shall be computed in either of the following ways:
 - (1) 200 pounds per square foot over the entire area of sidewalks and roadway.
 - (2) A local concentration of 20 kips on one axle with a hant wheel gauge
 - (3) For trolley cars as specified in section B.
 - (4) Loading due to construction equipment shall be substituted where such loading is in excess of the above.
 - 2. Allowable unit stresses in kips per square inch.

niasio .m

(1) Tension, net section

20

(2)	Compression	20 - 0.095 L/r
	but not to exceed	16.5
(3)	Bending, extreme fibre	20
(4)	Bearing:	
	Structural shapes	30
	Turned bolts	30
	Field rivets, power driven	25
(5)	Shear	
	Structural shapes, gross section	15
	Turned bolts	15
	Field rivets, power driven	12.5
(6)	Welds, 1/4" nominal size	2
	3/8" " "	3
	1/2" " "	4
	5/8" " "	5

b. Timber:

The same allowable unit stresses shall be used as are given in section D.

(2)	Compression	20 - 0.095 1/2
	but not to exceed	16.5
(3)	Bending, extreme fibre	. 20
114	Bearing:	
	Structural shapes	30
	Turned bolts	30
	Field rivets, power driven	25
(5)	Shear	
	Structural shapes, gross section	15
	Turned bolts	. 15
	Field rivets, power driven	12.5
(9)	Welds, 1/4" nominal size	S
	3/8" " "	3
	r1 11 11 <u>C</u>	4
	E	7

b. Timber

. . . re allowable unit stresses shall be used as are

E subsect of onyth

Specifications

Contract specifications and other documents have recently been prepared for the Tremont Street Subway. These specifications covering somewhat similar construction, may be used as a guide in preparing the final specifications and other contract documents for this project.

Design of Facilities Prepared by the M. T. A.

Track work, signal system, power and lighting designs were prepared by the Engineering Department of the M.T.A. and prints of the preliminary drawings of this work are attached to our drawings.

Estimates of land damages, track work, signal system, power, and lighting were also prepared by the M.T.A. and are included in this report.

The following descriptions of Power, Signal System, Lighting, and Track Work were furnished us by the Engineering and Maintenance Department of the M. T.A.

Power

This extension will require some alteration and extension of the present power lines in the Washington Street Tunnel.

In general, duct lines and conduits will be provided in the new subway section for lighting and signals as well as for the

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Centered for the Special Street discussions for a present being and the contract of the contra

Track work, signal system, power and lighting designs were a second to the preliminary drawings of this work are attached to our drawings.

Cationales of last stronger, testioners, event applies, powers, and Highting were also applies by the MC TeA and are introduction this report.

The following rear stations of fearth in the Laglaces and Malace tenance Department of the M. T. A.

Power

This extension will require some alteration and extension will require some alteration and extension of the provided in the new subway sertion for high ing and conduits will be provided in the new subway sertion for high ing and appoints as well as for the

power cables. The removal of the present elevated structures along

Washington Street which now support the surface car trolley wires, will

require the erection of some new poles and wires.

The work also includes new overhead trolley wires

between Egleston Square and the proposed new station at Columbus

Avenue. The main power cables will be extended from the sub-stations

at Dudley and Egleston to the new rapid transit line.

The power installations include distribution conduit, cables, switches, overhead trolley wire, power feed and frequency changers.

Signal System

The signal system includes 89 three color automatic block signals each with electro pneumatic train stop to enforce the stop indication.

The signalling is designed for an operating headway of 90 seconds with trains of either 8 cars of the existing vehicles or 6 cars of a possible future 60' car.

Control of the speed of trains by signals, on curves and grades and to approaching occupied stations, has been designed as required for operating safety.

Also included are short line telephones needed for train operation only, as well as train position indications for the Signal Tower at Forest Hills.

Lighting

The lighting work includes all lighting fixtures for

power cables. The removal of the present clay medianess are its. Washington block wilders we account the saviers are itself, where, all require the erection of some new poles and wires.

The work also includes new overhead trolley wires

of the state of the proposition at the continue of the stations

iverse. The main presentation will be estanded from the site stations

at Dudley and Egleston to the new rapid transit line.

The power installations include distribution conduit,

Signal System

The signal system includes 89 three color automatic block signals each with electro pneumatic train stop to enforce the stop indication.

The signalling is designed for an operating headway of the second with the second with the second with the second second with the second secon

Control of the speed of trains by signals, on curves and grades and to seprenditing con appearance to the control of the required for operating safety.

Also included are short line telephones needed for trait operation and the same trait operation and the same trait operation at Forest Hills.

wairight.

The lighting work includes all lighting fixtures for

stations and subway illumination, line wiring, switching and protection.

Also included are all main light fixtures, load centers, transformers,

primary cables and connections for automatic Edison emergency service
in the event of M. T. A. power failure in the subway section and at

stations.

Incandescent lighting will be used of 60-cycle A.C.

The fixtures are suitable for either 150 or 200 watt lamps producing an average illumination level of approximately 8 or 12 foot candles.

Miscellaneous electrical work includes various electrical devices, such as, call bells, starting gongs, fire alarms, directional signs and lighting, train indicators and wiring for pumps, fans, heaters and public address system.

Track Work

The track work for this extension will be of similar construction as in the present Washington Street Tunnel. The track will be Standard Gauge, A.R.A. Type B 100# track rails and 85# electric conductor third rail.

All track will be laid on wood cross-ties with crushed stone ballast in the subway section and along the open right-of-way.

On the elevated section the cross-ties will rest on steel girders or trusses supported by traverse steel bents.

All curves of 3000 foot C.R. or less will have guard rails of 85# restraining rails on the inside of the curves to take the thrust. Curves of less than 3000 foot C.R. will have an easement

whithers and solveny filterstanding, they waster, positiving and properties.

Also included are all main vigit farmines, took nestern, transformers,
primary califes and commercious for automatic fidiest ensergeing sarries.

The the event of M.-T. A., power fathers in the interstynamics and at
studiese.

Incandescent lighting will be used of 60-cycle A. C.

The track work for this extension will be of similar continued to the cont

All track will be laid on wood cross-ties with crushed ten ast in the subway section and along the open right-of-way.

All curves of 3000 foot C.R. or less will have guard

at each end of the curve wherever possible.

At the outbound end of each station an emergency cross-over is placed for turning trains back whenever required.

These cross-overs will consist of two single points and an unbroken main line frog.

Estimates of Cost

Estimates of cost have been prepared for the work involved in the "Legislative" Route and in the "Alternate" Route. A breakdown of the cost estimates, based on an accurate take-off of quantities and unit prices which are, in our opinion, representative of present day costs, is included herein.

The estimates are divided into the four contract sections recommended hereinbefore. Summaries of the detailed estimates are also submitted.

at each end of the curve wherever possible.

At the outbound end of each station an emergency

Attaces represented for the state of the state of the earliest state of the state o

Estimates of Cost

Equipment to the state of the soul and the state of the same of the state of the st

ESTIMATE

EXISTING BOYLSTON STATION TO DOVER STREET

No.	Item	Quantity	Unit	Unit Price Amount
	I. PRELIMINARY WOL	RK		
1	Borings and Test Pits			L.S. \$ 4,500
	II. RAPID TRANSIT C	ONSTRUCTIO	ON	
	A. BOYLSTON ST. C	ONNECTION	•	
2 3 4	Structural Steel (Rolled " " (Temp	1,640	Ton C. Y.	\$275.00 \$46,750 180.00 9,720 37.00 60,680
5	Reinforcing Steel			0. 11 17, 270
6	Demolition of Concrete Removal of Structural			160.00 12,960
8	Track Removal			1.00 320
9	Earth Excavation	4,320	C. Y.	10.75 46,440
	Waterproofing - 6 Ply	373		
11	1 1 H 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1,710	S. Y.	and the second s
				\$254,425
	B. DORE ST. TO OA	K ST. (OPEN	CUT)	
12	Excavation - 0' to 10'	9,710	C. Y.	\$ 8.75 \$84,963
13	" - over 10'		C. Y.	10.75 222, 203
14	Concrete Masonry			37.00 229,770
15	Reinforcing Steel	819,000	Lbs.	0.11 90,090
16 17	Decking - Roadway Restoration - Roadway			30.00 102,300
18	Waterproofing - 6 Ply			8.00 27, 280 5.20 21, 892
19		3, 340	S. Y.	3.50 11,690
20	- 3 H	1,590	S. Y.	2.70 4,293
				\$794,481
	C. COMPTON ST. TO BUILDINGS	DOVER ST.	. (UNDE	2
21	Excavation - 0' to 10'	. 5 430	CV	\$ 8.75 \$47,512
22		10,450		\$ 8.75 \$47,512 10.75 112,337
23	Concrete Masonry			37.00 164, 280
24	Reinforcing Steel	524,000		0.11 57,640
25	Structural Steel (Rolled		Ton	275.00 139, 150
26	Beam Wrapping			
27	Decking - Roadway			30.00 7,980
28	" - Sidewalk	160	S. Y.	20.00 3,200

Mark Market

EXISTENG BOYLSTON STATION TO DOVER STREET

Amount	init Price	Unit U	Quantity	Item	No.
				I PRELIMINARY WORK	
\$ 4,500	L.S.			Borings and Test Pits	1
		V	STRUCTIO	II. RAPID TRANSIT CON	
			INECTION	A. BOYLSTON ST. CON	
\$46,750	\$275.00	Ton	170	Structural Steel (Rolled)	S
9,720	180.00	Ton	54	" (Temp.)	3
60,680	37.00	C. Y.	1,640	Concrete Masonry	4
17, 270	0.11	Lbs.	157,000		5
52,360	55.00	C. Y.	952	Demolition of Concrete	9
12,960	160.00	Ton	eel 81	Removal of Structural Ste	7
320	1.00	L. F.	320	Track Removal	8
46,440	10.75	C. Y.	4,320	Earth Excevation	6
0.647.1	08 - 8	.8. 0	373	Waterproofing - 6 Fly	0.1
5,985	3.50	S. Y.	1,710	11 P = 11	11
or the field of the second second second		(1111)	waso) .rs	E DORE ST. TO DAKE	
\$84,963	\$ 8.75	C, Y.	9,710	Excavation - 0' to 10'	12
222, 203	10.75	C.Y.	20,670	11 - over 10'	13
229,770	37.00	C.Y.	6, 210	Concrete Masonry	14
90.090	11.0	18665	000,818	least guiz-minist	1.5
102,300	30.00	S. Y.	3,410		16
27, 280	00.8	S. Y.	3,410		17
598,05	05 ?	4 4	0.75 (4:	Waterproofing - 6 Ply	9.5
11,690		S. Y.		11 4 11	19
4, 293	2.70	** **		" = 3 "	05
\$794,481					
		/ PMMU)	To HEALT	C. COMMTON ST. TO	
		AN TOLE A	3 × 11 Ct 41 II. 11 / 12	BUILDIMOS	
\$47,512	\$ 8.75	C.Y.	5,430	Excavation - 0' to 10'	21
112,337	10.75	C.Y.	10,450	" - over 10'	22
164, 280	37.00	C. Y.	4,440	Concrete Masonry	23
57,640	0.11	Lbs.	524,000	Reinforcing Steel	24
139, 150		Ton	506	Structural Steel (Rolled)	25
975	0.65	Lbs.	1,500	Beam Wrapping	26
7,980	30.00	S. Y.	266	Decking - Roadway	27
3, 200	20.00	S.Y.	160	" - Sidewalk	28

EXISTING BOYLSTON STATION TO DOVER STREET

No.	Item	Quantity	Unit	Unit Pri	re Amount
	Todayasiderillaren	Mathematical States	weither the same	THE RESERVE OF THE PARTY OF THE	We will be a first of the property of the prop
29	Restoration - Roadway	266	S. Y.	8.00	2, 128
30	- Sidewalk	160		9.00	1,440
31	Waterproofing - 6 Ply	2, 840			14, 768
32	н 4 н	1,470		3.50	5, 145
33		830	, S. Y.	2.70	2, 241 \$558, 796
					to the contract of the contrac
	III. UNDERPINNING				
	and operated to the configuration of the configurat				
	A. COBB ST. TO DOVE	ER ST.			
	(BUILDINGS)				
34	Concrete Masonry	830	C. Y.	\$ 37.00	\$30,710
35	Structural Steel (Temp)	242	Ton	180.00	43,560
36	" (Rolled)	43	Ton	275.00	11,825
37	Demolition of Concrete	350		55.00	19, 250
38	Timber	217	M. B.		43, 400
39	Maintenance of Buildings	5		L.S.	10,000
					\$158,745
	IV. VENTILATION				
	Sent formach Sent formach (Sent formach formach formach formach formach for the formach for the formach formach formach for the formach formach formach for the formach formach for the formach formach formach formach for the formach formach formach for the formach formach formach formach formach for the formach formach formach formach formach for the formach formac	`			
40	Grating	1,500	S.F.	\$ 4.50	\$ 6,750
41	Concrete Masonry	420	C. Y.	37.00	15,540
42	Reinforcing Steel	13,000	Lbs.	0.11	1,430
43	Fan Chambers and Equip	oment 2	Ea.	17,500.00	And the Contract of the Contra
				:	\$58,720
	V. RELOCATION OF CI	TY OWNED	UTILI	ries	
	A. WATER MAINS				. *
	Territoria de la constitución de				
	1. Boylston St. to War	renton St.			
44	12" Main	963	L.F.	\$ 5.00	\$ 4,815
45	16" "	1, 183	L.F.	6.00	7,098
46	20" "	53	L.F.	7.00	371
					\$12, 284
	2. Warrenton St. to I	over St.			
47	6" Main	386	L.F.	\$ 3.00	\$ 1,158
48	8 ¹¹ 11	84	L.F.	3,50	294
49	10" "	195	L.F.	4.00	780
50	12" "	126	L. F.	5.00	630

EXAMPLE BOYLLING BY HOLYSTON TO DOVER STREET

	10000				
Amen's	-19V		11000	Merid	.212
At u.S.		17.2	885	Biggiardion - Randway	
11000	1100	, . , =	(86)	discalific the	06.
e 2 - 2	Jo ev	0 A 054	ENTER FOR	TESTA VALVESAME TO VAR	. ,
ERE D	AS CO AS	es de des.	071	** *	. ·
2,261	2.70	S. Y.	830	11 8 - 3 11	33
SECTION.					
				THE STREET, STREET, THE	
			VIII. SE	NOW OF THE COOP IN	
\$30,710	\$ 37.00	C.Y.	830	Concrete Mascary	34
140 44	00 mail		588	Questi decit lenementi	7.5
MARKET .	20.00	na Y		(in link)	,·
864, 371		30		Personal be within the	-
43,406	M. 200.00	M.B.	217	Timber	38
aan ar	L. S.		8	Maintenance of Bailding	39
				IV. VENTILATION	
\$ 6,750	\$ 4.50	S.F.	1,500	Grating	40
15,540	37.00	C. Y.	420	Concrete Masonry	41
1,430	0.11	adJ.	13,000		42
35,600	17, 500.00	Ea.		Fan Chambers and Equi	43
001 700¢					
	EST	Derien!	United PT	V. RELOCATION OF E	
				A. WATER BARRE	ь 5.
			-Similaria	I Beginne 22 in Ta	
C16,4 ¢	UU.C 4	e there	coy	12" Main	éè
7,098	6,00	L. F.	1,183	1611 11	45
371	7.00	L. F.	53	20" "	46
-Y_1R					
			0.4040	on Wassesself d	
\$ 1,158	\$ 3.00	L, F.		6" Main	47
294	3,50	J. F.			10.0
780	4.00	L, F.	-11L		2.5
630	5.00	L. F.	-610	12" "	50

EXISTING BOYLSTON STATION TO DOVER STREET

No.	<u>Item</u> <u>Quar</u>	ntity	Unit	Unit Price	Amount
51 52	16" Main Water Manholes	195 3	L. F. Ea.	6.00 200.00	1,170 600 \$ 4,632
	B. SEWERS				
	1. Boylston St. to Warrento	on St.			
53 54 55 56 57	20" Pipe 30" " Supports for 12" Pipe " " 20" " Sewer Manholes	240 280 240	L. F. L. F.	\$ 12.00 15.00 8.50 12.00 200.00	3,600 2,380 2,880
	2. Warrenton St. to Dover	St.			
58 59 60 61 62 63	12" Pipe 33" " Supports for 12" x 18" Brick " " 12" x 16" " " " 10" Pipe " " 12" "	40 40	L. F. L. F. L. F. L. F. L. F.	\$ 8.50 16.00 10.00 10.00 8.00 8.50	\$ 340 3,200 400 400 320 340 \$ 5,000
	C. SIPHONS				
	1. Boylston St. to Warrento	on St.			
64	At Dore St 30" A Communication of the Communicat	80	L.F.	\$ 61.00	\$ 4,880
	D. FIRE MAINS				
	1. Boylston St. to Warrento	on St.			
65	20" Pipe	995	L.F.	\$ 17.50	\$17,413
	E. M.T.A. HIGH TENSION	DUCT			
	1. Warrenton St. to Dover	St.			
66	Duct	420	L.F.	\$ 2.20	\$ 924

DIESTAND BOYLLY DY STATION OUR BOYES OF ALKS

javomA :	Unit Price	Unit	Quantity	nesser.	"¢ "ć
1,170 600 \$ 4,632	6.00	L. F. Ea.	195	ló" Main Water Manholes	
				Elimina ja	
			arrenton St.	1. Boylston St. to W	
\$ 8,460	\$ 12.00	L. F.	705 240	20" Pipe 30" "	8 A
2,380	8,50	L. F.	280	Supports for 12" Pipe	, k.
2,880	12.00	L. F.	240	11 201 11	76
1,600	200.00	Ea.	8	Sewer Manholes	3
			Dover St.	2. Warrenton St. to	
\$ 340	\$ 8.50	L. F.	40	12" Pipe	9.8
3,200	16.00	L. F.	200	33" "	53
400	10.00	L. F,		Supports for 12" x 18"	
400	10.00	L. F.		" " 12" x 16"	1.6
320	8.00	L. F.	40	" 10" Pipe	
340 \$ 5,000	8,50	L. F.	40	n nZI n n	14
c .				C. SIPHONS	
			arrenton St.	1. Boylston St. to W	
\$ 4,880	\$ 61.00	L. F.	08	At Dore St 30"	161
				D. FIRE MAINS	
			arrenton St.	1. Boylston St. to W	
\$17,413	\$ 17.50	L. F.	995	20" Pipe	£1,2
			NSIGHT HILL	E. M.T.A. HIGH TH	
			Dover St.	Warrenton St. to	
\$ 924	\$ 2.20	L. F.	420	bed	43.

	EXISTING BOYLSTON STATION TO DOVER STREET
No.	Item Quantity Unit Unit Price Amount
	VI. EQUIPMENT
	A. PUMPS
67	1. Corning St. 1 (4) Ea. \$10,000.00 \$10,000
	VII. MAINTENANCE OF TRAFFIC
68	1. Flagmen at Boylston St. 2 Yrs. \$12,000.00 \$24,000
	VIII. CONSTRUCTION - OAK ST. TO COMPTON ST.
	A. OPEN CUT METHOD UNDER N. Y., N. H. & H. & B. & A. R.R. TRACKS
	1. Rapid Transit Construction
69 70 71 72	Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 " - over 10' 40,000 C. Y. 10.75 430,000 Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395
73 74	Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678
75 7	Decking - Roadway 1,510 S. Y. 30.00 45,300
76 77	" - Sidewalk 246 S. Y. 20.00 4,920 Restoration - Roadway 1,510 S. Y. 8.00 12,080
78	" Sidewalk 246 S. Y. 9.00 2,214
79	Waterproofing - 6 Ply 9,050 S. Y. 5.20 47,060
80 81	" - 4 " 4, 170 S. Y. 3. 50 14, 595 " - 3 " 1, 690 S. Y. 2. 70 4, 563
01	\$1,690,800
	2. Underpinning Buildings
82 83 84	Concrete Masonry 470 C. Y. \$ 37.00 \$17,390 Structural Steel (Temp.) 136 Ton 180.00 24,480 " (Rolled) 25 Ton 275.00 6,875
85 86	Demolition of Concrete 200 C. Y. 55.00 11,000 Timber 124 M.B.M. 200.00 24,800
87	Timber 124 M.B.M. 200.00 24,800 Maintenance of Buildings L.S. 15,000 \$99,545
	3. Underpinning N. Y., N. H. & H. & B. & A. R. R. Tracks
88 89	Excavation 6,200 C. Y. \$ 10.75 \$66,650 Structural Steel (Temp.) 215 Ton 180.00 38,700

Item Quantity Unit Price Amount VILLE Equation Price Amount Price Equation Eq
67 1. Corning St. 1 Ea. \$10,000.00 \$10,000 \$10
1. Corning St. 1 Ea. \$10,000.00 \$10,000 1. Flagmen at Boylston St. 2 Yrs. \$12,000.00 \$24,000 VIII. CONSTRUCTION - OAK ST. TO COMPTON ST. A. OPEN CUT METHOD UNDER N. Y. , N. H. & 1. Rapid Transit Construction 1. Rapid Transit Construction Concrete Masonry 15,680 C. Y. \$ 8.75 \$137,200 Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Beam Wrapping 4,120 Lbs. 0.65 2,678 Restoration - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Waterproofing - 6 Ply 9,050 S. Y. 9,00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 5.20 47,060 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Water 9,000 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565
1. Corning St. 1 Ea. \$10,000.00 \$10,000 1. Flagmen at Boylston St. 2 Yrs. \$12,000.00 \$24,000 VIII. CONSTRUCTION - OAK ST. TO COMPTON ST. A. OPEN CUT METHOD UNDER N. Y. , N. H. & 1. Rapid Transit Construction 1. Rapid Transit Construction Concrete Masonry 15,680 C. Y. \$ 8.75 \$137,200 Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Beam Wrapping 4,120 Lbs. 0.65 2,678 Restoration - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Waterproofing - 6 Ply 9,050 S. Y. 9,00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 5.20 47,060 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Water 9,000 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565 Waterproofing - 6 Ply 9,050 S. Y. 2.70 4,565
1. Flagmen at Boylston St. 2 Yrs. \$12,000.00 \$24,0
1. Flagmen at Boylston St. 2 Yrs. \$12,000.00 \$24,000 VIII. CONSTRUCTION - OAK ST. TO COMPTON ST. A. OPEN CUT METHOD UNDER N. Y., N. H. & I. Rapid Transit Construction 2. Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 Excavation - 0' to 10' 40,000 C. Y. 10.75 430,000 Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Decking - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 30.00 45,300 Waterproofing - 6 Ply 9,050 S. Y. 3.50 12,080 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 "" - 3 " 1,690,800
1. Flagmen at Boylston St. 2 Vrs. \$12,000.00 \$24,000 VIII. CONSTRUCTION - OAK ST. TO COMPTON ST. A. OPEN CUT METHOD UNDER N. Y., N. H. & H. & B. & A. R. R. TRACKS 1. Rapid Transit Construction Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 O. C. Y. \$ 10.75 \$430,000 O. Y. \$ 10.75 \$4300 O. Y. \$ 10.75 \$4300 O. Y. \$ 10.75 \$4300 O. \$ 1.500 O. \$ 1.50
VIII. CONSTRUCTION - OAK ST. TO COMPTON ST. A. OPEN CUT METHOD UNDER N. Y., N. H. & H. & B. & A. R. R. TRACKS 1. Rapid Transit Construction C. Excavation - O' to 10' 15,680 C. Y. \$ 8.75 \$137,200 C. T. Over 10' 40,000 C. Y. 10.75 430,000 C. C. Concrete Masonry 12,560 C. Y. 37.00 464,720 Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Decking - Roadway 1,510 S. Y. 30.00 45,300 C. C. C. C. C. C. S. C.
A. OPEN CUT METHOD UNDER N. Y., N. H. & H. & B. & A. R. R. TRACKS 1. Rapid Transit Construction Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Decking - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 80.00 45,300 Restoration - Roadway 1,510 S. Y. 80.00 2,214 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Waterproofing - 6 Ply 9,050 S. Y. 9.00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 "" - 4 " 4,170 S. Y. 3.50 14,595
H. & B. & A. R. TRACKS 1. Rapid Transit Construction Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 10 10' - over 10' 40,000 C. Y. 10.75 430,000 10 10 10 10 10 10 10 10 10 10 10 10
H. & B. & A. R. TRACKS 1. Rapid Transit Construction Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 10 10' - over 10' 40,000 C. Y. 10.75 430,000 10 10 10 10 10 10 10 10 10 10 10 10
Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 " - over 10' 40,000 C. Y. 10.75 430,000 " Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Decking - Roadway 1,510 S. Y. 30.00 45,300 " - Sidewalk 246 S. Y. 20.00 4,920 Restoration - Roadway 1,510 S. Y. 8.00 12,080 " - Sidewalk 246 S. Y. 9.00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 " - 4 " 4,170 S. Y. 3.50 14,595 1,690 S. Y. 2.70 4,563
Excavation - 0' to 10' 15,680 C. Y. \$ 8.75 \$137,200 "" - over 10' 40,000 C. Y. 10.75 430,000 "" Concrete Masonry 12,560 C. Y. 37.00 464,720 "" Reinforcing Steel 1,494,500 Lbs, 0.11 164,395 "Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 "" - Sidewalk 246 S. Y. 30.00 45,300 "" - Sidewalk 246 S. Y. 20.00 4,920 "" - Sidewalk 246 S. Y. 8.00 12,080 "" - Sidewalk 246 S. Y. 9.00 2,214 "" - Sidewalk 246 S. Y. 9.00 2,214 "" - 4 " 4,170 S. Y. 3.50 14,595 "" - 4 " 4,170 S. Y. 3.50 14,595 "" - 3 " 1,690 S. Y. 2.70 4,563
Concrete Masonry 12,560 C. Y. 10.75 430,000 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Decking - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 4,170 S. Y. 3.50 14,595 " - 4 " 4,170 S. Y. 3.50 14,595
Concrete Masonry 12,560 C. Y. 37.00 464,720 Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Decking - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Restoration - Roadway 246 S. Y. 9.00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 4 " 4,170 S. Y. 3.50 14,595 " - 3 " 1,690 S. Y. 2.70 4,563
Reinforcing Steel 1,494,500 Lbs. 0.11 164,395 Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Decking - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 20.00 4,920 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 Waterproofing - 6 Ply 1,70 S. Y. 3.50 14,595 Waterproofing - 3 " 1,690 S. Y. 2.70 4,563
Structural Steel (Rolled) 1,313 Ton 275.00 361,075 Beam Wrapping 4,120 Lbs. 0.65 2,678 Decking - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Restoration - Roadway 246 S. Y. 9.00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 3.50 14,595 "" - 4 " 4,170 S. Y. 3.50 14,595 "1 - 4 " 1,690 S. Y. 2.70 4,563
Beam Wrapping 4,120 Lbs. 0.65 2.678 Decking - Roadway 1,510 S. Y. 30.00 45,300 Restoration - Roadway 1,510 S. Y. 20.00 4,920 Restoration - Roadway 1,510 S. Y. 8.00 12,080 Waterproofing - 6 Ply 9,050 S. Y. 5.20 47,060 Waterproofing - 4 " 4,170 S. Y. 3.50 14,595 1,690 S. Y. 2.70 4,563
Decking - Roadway 1,510 S. Y. 30.00 45,300 1.510 S. Y. 20.00 4,920 4,920 1.510 S. Y. 8.00 12,080 1.510 S. Y. 8.00 12,080 1.510 S. Y. 9.00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 5.20 47,060 1.510 S. Y. 3.50 14,595 1.690 S. Y. 2.70 4,563 1.690 S. Y. 2.70 4,563 1.690 S. Y. 2.70 4,563
" - Sidewalk 246 S. Y. 20.00 4,920 Restoration - Roadway 1,510 S. Y. 8.00 12,080 " - Sidewalk 246 S. Y. 9.00 2,214 Waterproofing - 6 Ply 9,050 S. Y. 5.20 47,060 " - 4 " 4,170 S. Y. 3.50 14,595 " - 3 " 1,690 S. Y. 2.70 4,563
Restoration - Roadway 1,510 S. Y. 8.00 12,080 Whaterproofing - 6 Ply 9,050 S. Y. 5.20 47,060 Herefore in -4" 4,170 S. Y. 3.50 14,595 Herefore in -3" 1,690 S. Y. 2.70 4,563
" - Sidewalk 246 S.Y. 9.00 2,214 " Waterproofing - 6 Ply 9,050 S.Y. 5.20 47,060 " - 4 " 4,170 S.Y. 3.50 14,595 " - 3 " 1,690 S.Y. 2.70 4,563 \$1,690,800
Waterproofing - 6 Ply 9,050 S.Y. 5.20 47,060 1 4,170 S.Y. 3.50 14,595 2 10 1,690 S.Y. 2.70 4,563 3 1,690,800
" -4" 4,170 S.Y. 3.50 14,595 " -3" 1,690 S.Y. 2.70 4,563 \$1,690,800
1,690 S.Y. 2.70 4,563 \$1,690,800
\$1,690,800
E HILDERICE VILLIANTI TOCAL S
Concrete Masonry 470 C.Y. \$ 37.00 \$17,390
Structural Steel (Temp.) 136 Ton 180.00 24,480
(Rolled) 25 Ton 275.00 6,875
64. Demolition of Concrete 200 C.Y. 55.00 11,000
Timber 124 M.B.M. 200.00 24,800
Maintenance of Buildings L. S. 15,000
\$99,545
3. Underpinning N. Y., N. H. & H. &
B. & A. R. R. Tracks
Excavation 6,200 C.Y. \$ 10.75 \$66,650
87 Shrmiaral Steel (Temp.) 215 Tem 135-100

EXISTING BOYLSTON STATION TO DOVER STREET

No.	Item	Quantity	Unit	Unit Price	e Amount
90 91	Timber Timber Piles			200.00	12,000 24,000 \$141,350
	4. Underpinning	Retaining Walls			
92 93 94	Structural Steel (Bu " (Te Temporary Steel Pi	mp.)	Ton	\$425.00 180.00 12.00	\$11,475 1,980 18,168 \$31,623
	B. SHIELD DRIVE	N TUNNEL ALT	AND THE PERSON NAMED IN COLUMN 2 IN COLUMN	UNDER N	. Y.
	1. Tunnel		e de l'anni de la descripción de la dela de la dela dela dela dela de		
95 96 97 98 99 100 101 102 103 104 105 106	Tunnel Excavation C. I. Tunnel Lining High Tensile Steel E Gravel Packing Grout Outside C. I. Concrete Inside " 3 1/2 Vit. Clay Duc Reinforcing Steel in Covers Splicing Chambers Hand Rail Electrolysis Bonds Sump (Between Tube	4,708 Bolts 50,255 1,060 Lining 2,120 2,272 ts 14,110 Duct 4 12 1,420 2	C. Y. Bbl. C. Y. L. F. Ton Ea.	25.00 60.00 0.75 400.00 400.00 1.25 500.00 L.S.	\$787,500 932,184 62,819 26,500 53,000 136,320 10,583 1,600 4,800 1,775 1,000 20,000 62,038,081
	2. Transition Sul	oway Section			
107 108 109 110 111 112 113 114 115	Excavation - 0' to 1 " - over 1 Concrete Masonry Reinforcing Steel Structural Steel Beam Wrapping Waterproofing - 6 P " - 4 ' " - 3 '	0' 17, 350 5, 340 643, 300 492 1, 700 Ply 4, 280 ' 1, 970	C. Y. C. Y.	\$ 8.75 10.75 37.00 0.11 275.00 0.65 5.20 3.50 2.70	

EXISTING BUYGOTON STATION TO DUVER STEELT

e Amount	Unit Price	0.00	Quantity	Item	.aK
James 1	, 9, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,	-	Chic de vocan divisionary de la laboration		
100 (50)	200.00	M. B. H	09	Timber	00
COV.15		, ,	9,600	Timber Piles	1.9
Delaters					
				- n - n n -	
		8	ning Walls	4. Underpinning Retai	
			,	Character 2 Co. 1	20
251,473	\$425,00	DOT.	72 (0	Structural Steel (Built-up	2 (8 P
1	180.00	1107		Townsons Steel Did	* C
RAL/SI	12.00		1,514	Temporary Steel Piles	x. /
FERALLE					
	or Southern -	-	Ak America	R HUNTED DRIVERS OF	
-2		RACKS	R.R.TI	N. H. & H. & B. & A	
			,		
				Const 1	
CHI	00 00 6		15,750	Tunnel Excavation	8.6
DOC TARE	\$ 50.00		4,708	C. L. Tunnel Lining	30
MEI SEE	198,00	4.4 	50, 255	High Tensile Steel Bolts	7,11
WIN (La)	1. 25	-Y-3	1,060	Gravel Packing	87
005/82	25.00	. 4 1 1	000,1	Grout Outside C. I. Lining	0.6
22,198	25.00 60.00	T, it	2,272	Concrete Inside " "	100
144(388)	0.75	78.45	14, 110	3 1/2 Vit. Clay Ducts	101
me.or	Ct.U		011 (-1	Reinforcing Steel in Duct	3.01
EUGLAD	400.00	-107	16	icercal?	
0.000	400.00		12	Splicing Chambers	8.61
277.4	1. 25	, 14	1,420	Hand Rail	104
mint ()	500,00		S	Electrolysis Bonds	600
0.000_005	L.S.			Sump (Between Tubes)	901
THE BEILD					
			• 1	Transmition Colores	
			COLLON	2. Transition Subway S	
7 AU (913:	-	. 7	6,750	reavation - 0' to 10'	FOL
146-516	10 75		17,350	" - over 10"	801
,	37.00	7.5	000,0	Coursels Massagy	601
UNC. CY	0.11	2.6.0	00Z .T#	Kalminering Steel	- 811
mo, act	275.00		109	Sirectoral Busy	111
191/1	0.65	mid-	1,700	Beam Wrapping	\$ 11
185.35	5, 20	37 (2)		Waterbeington - V 515	8 8, 9
250.0	3.50	17.0	DY# +J	A 41	9(1)
670.2	2.70	27.75	770	" - 3 "	115
348,150	1				

EXISTING BOYLSTON STATION TO DOVER STREET

I. Including Open Cut Method Under N. Y., N. H. &

H. & B. & A. R. R. Tracks

Summary Item Nos. 1-68
Summary Item Nos. 69-94
Construction Cost
Contingencies - 10%

\$1,927,720
1,963,318
\$3,891,038
389,104
4,280,142

Engineering & Administration 10% 428, 014 \$4,708, 156*

II. Including Shield Driven Tunnel Alternate Under

N. Y., N. H. & H. & B. & A. R. R. Tracks

Summary Item Nos. 1-68 \$1,927,720
Summary Item Nos. 95-115 2,719,635
Construction Cost \$4,647,355
Contingencies - 10% 464,735
5,112,090

Engineering & Administration 10% 511, 209 \$5,623, 299*

* Does not include cost of: Track Work, Power, Signals and Lighting, Land Damages, Demolition of Existing Washington St. Elevated and Interest During Construction

THERES HAVING DIT HOLT A DEHOLE A TOUR CONTROLS.

in the Country Country and the country and the same BARRY DE DE LA COMPANIA

\$1,927,720 Es 1 (1) (1) (2) (3) 1,963,318 Leading them han 1922 No. 93 Construction Cost 389, 104

Contingencies - 10%

4.280.142

428,014 Engineering & Administration 10%

\$4,708,156*

saleD eligantsk lesse"C myleth Map(C onlinter) S ... N. H. & H. & B. & A. R. R. Tracks

\$1,927,720 Summary Item Nos. 1-68

ALLIFIT,S Summary Item Nos. 95-115 CCC (120 . 1 Court willy Cart

464,735 Contingencies - 10% 480,511.8

21112 Engineering & Administration 10%

15,821,490

* Does and such de well at Track Walls Power State of ... June Demolition of Existing Washington St. the end of the rest of the Construction

ESTIMATE

No.	Item	Quantity	Unit	Unit Price Amount			
	I. PRELIMINARY WORK						
116	Borings and Test Pits		e e e e e e e e e e e e e e e e e e e	L.S. \$ 9,000			
	II. RAPID TRANSIT CON	STRUCTI	ON				
	A. DOVER ST. TO LEE	OX ST.					
117 118 119 120 121 122	Concrete Masonry Reinforcing Steel 3 Decking - Roadway Restoration - Roadway	96,010 29,310 ,970,000 16,540 16,540	S. Y.	10.75 1,032,108 37.00 1,084,470 0.11 436,700 30.00 496,200 8.00 132,320			
1 23 1 24 1 25	Waterproofing - 6 Ply 11 - 4 11 12 - 3 11	16, 170	S. Y. S. Y. S. Y.	5. 20 106, 028 3. 50 56, 595 2. 70 20, 817 \$3, 744, 288			
	B. UNION PARK STREET STATION						
126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141	Excavation - 0 to 10' " - over 10' Concrete Masonry Reinforcing Steel Structural Steel (Rolled) Beam Wrapping Decking - Roadway " - Sidewalk Restoration - Roadway " - Sidewalk Waterproofing - 6 Ply " - 4" Concrete Finish Tile Railing Escalator	6, 280 63, 700 976 1, 400 1, 778 889 1, 778 889 3, 700 4, 250 67, 040	C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y. S. Y. S. F.	10.75 283,693 37.00 232,360 0.11 7,007 275.00 268,400 0.65 910 30.00 53,340 20.00 17,780 8.00 14,224 9.00 8,001 5.20 19,240 3.50 14,875 0.30 20,112			
	C. MASSACHUSETTS A	VENUE S	TATION				
142 143 144	Excavation - 0' to 10' '' - over 10' Concrete Masonry	26, 800	C. Y.	\$ 8.75 \$85,575 10.75 288,100 37.00 253,080			

amesma s	3-59 16	1.31	eliteus C	nem	in M
				I. PRELIMINARY WORK	
\$ 9,000	La S.			Borings and Test Pits	116
		16	AND CONTRACTORS	II. RAPID TRANSIT CONS	
		72	THE A SECTION ASSESSMENT	AND THE THE TAXABLE PROPERTY OF THE PARTY OF THE	
			OX ST.	A. DOVER ST. TO LEN	
\$379,050	\$ 8.75	C. Y.	43,320	Excavation - 0' to 10'	117
1,032,108	10.75	C, Y.	96,010	" - over 101	118
1,084,470	37.00	C.Y.	29,310	Concrete Masonry	119
436,700	0.11	Lbs.		Reinforcing Steel 3,	120
496, 200	30.00	S. Y.	16,540	-	121
132,320	8,00	S.Y.	16,540	Restoration - Roadway	122
E10.401	05.17		OFE OS	Waterprocling a h Ply	1.23
56,595	3.50	S.Y.	16, 170	11 4 11	124
20,817	2.70	S.Y.	7,710	11 _ 3 11	125
3, 744, 283		2 4. 04.	0114		Com I
or he sizes or specification beautiful and and are	Arous		OVERAGE WE	D. THURN PARK MERCE	
		-54	VALUE OF	ELECTION OF STREET	
\$81,025	\$ 8.75	C. Y.	9,260	Excavation - 0 to 10	126
200,885	BT 03	3 3	002,05	101 1000 -	1944
232, 360	37.00	C. Y.	6,280	Concrete Masonry	128
7,007	0,11	.ad.I	63,700	Reinforcing Steel	129
266,400	275,00	em 3	STE	(bullos) fasti frantarak-	17.8 2
910	0.65	Lbs.	1,400	Beam Wrapping	131
dit, to	00.07	7	458.1	DECLINE - HARRY	111
17,780	20.00	S. Y.	889	" - Sidewalk	133
14,224	8.00	S. Y.	1,778	Restoration - Roadway	134
8,001	9.00	S. Y.	688	" - Sidewalk	135
0.10.171	0.5 1 6	Yull	3,700	Waterproofing a hills	336
14,875	3.50	S. Y.	4, 250	11 1 11	137
231.05	02.6	4,11,15	3143 (34)	Centrale Platen	5.0
43,008	2.80	S, F,	15,360	Tile	139
3, 936	6.00	L. F.	506	Railing	140
47,000	L.S.			Escalator	141
11, 114, 011					
to come and and and an analysis of	Donar edons				
		HOITA	28 JUNAY	C. HASSICHUSETTE A	
\$85,575	\$ 8.75	C, Y,	9,780	Excavation - 0' to 10'	142
288, 100	10, 75	C. Y.	26,800	" - over 10'	143
253,080	37.00	C.Y.	6,840	Concrete Masonry	144

No.	<u>Item</u>	Quantity	Unit	Unit Pric	ce Amount
145	Reinforcing Steel	77, 500	Lbs.	0.11	8,525
146	Structural Steel(Rolled)		Ton		264,550
147	Beam Wrapping		Lbs.		•
148	Decking-Roadway		S. Y.		
149	" - Sidewalk	889			17, 780
150	Restoration - Roadway		S. Y.		14, 224
151	" - Sidewalk		S. Y.		8,001
152	Waterproofing - 6 Ply				19,084
153	" - 4 Ply	4,550			15, 925
154	Concrete Finish				
155					44,744
156	Railing				3,036
					\$1,097,133
b.	III. VENTILATION				
157	Grating	6,500	S. F.	\$ 4.50	\$29, 250
158	Concrete Masonry	1,840	C.Y.	37.00	68,080
159	Reinforcing Steel	58,000	Lbs.	0.11	6,380
160	Fan Chambers & Equipme				
					\$121,210
					Columnia Col
	IV. RELOCATION OF CIT	YOWNE	D UTILI	TIES	
	IV. RELOCATION OF CIT A. WATER MAINS	YOWNE	D UTILI	TIES	
	## Security of the Conference	Y OWNE	D UTILI	TIES	
	## Security of the Conference		D UTILI	TIES	
141	A. WATER MAINS 1. Dover St. to Lenox S		and the second s	and a second and a	~ ¢ 2.74n
161	A. WATER MAINS 1. Dover St. to Lenox S 6" Main	920	${ m L}_{4}$ ${ m F}_{4}$	\$ 3.00	\$ 2,760
162	A. WATER MAINS I. Dover St. to Lenox S 6" Main 8" "	920 310	L. F. L. F.	\$ 3.00 3.50	1,085
162 163	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" "	920 310 290	L. F. L. F. L. F.	\$ 3.00 3.50 4.00	1,085 1,160
162 163 164	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" "	920 310 290 5,000	L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5,00	1,085 1,160 25,000
162 163 164 165	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" "	920 310 290 5,000 325	L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00	1,085 1,160 25,000 1,950
162 163 164 165 166	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 20" "	920 310 290 5,000 325 339	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00	1,085 1,160 25,000 1,950 2,373
162 163 164 165	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" "	920 310 290 5,000 325	L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00	1,085 1,160 25,000 1,950 2,373 2,100
162 163 164 165 166	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 20" "	920 310 290 5,000 325 339	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00	1,085 1,160 25,000 1,950 2,373
162 163 164 165 166	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 20" " 30" "	920 310 290 5,000 325 339	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00	1,085 1,160 25,000 1,950 2,373 2,100
162 163 164 165 166	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 20" "	920 310 290 5,000 325 339	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00	1,085 1,160 25,000 1,950 2,373 2,100
162 163 164 165 166	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 20" " 30" "	920 310 290 5,000 325 339 140	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00	1,085 1,160 25,000 1,950 2,373 2,100
162 163 164 165 166 167	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 20" " 30" " B. SEWERS 1. Dover St. to Lenox S	920 310 290 5,000 325 339 140	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00 15.00	1,085 1,160 25,000 1,950 2,373 2,100 \$36,428
162 163 164 165 166 167	A. WATER MAINS I. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 30" " B. SEWERS 1. Dover St. to Lenox S	920 310 290 5,000 325 339 140	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00 15.00	1,085 1,160 25,000 1,950 2,373 2,100 \$36,428
162 163 164 165 166 167	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 30" " B. SEWERS 1. Dover St. to Lenox S 12" Pipe 15" "	920 310 290 5,000 325 339 140	L. F. L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00 15.00 \$ 8.50 9.50	1,085 1,160 25,000 1,950 2,373 2,100 \$36,428
162 163 164 165 166 167	A. WATER MAINS 1. Dover St. to Lenox S 6" Main 8" " 10" " 12" " 16" " 30" " B. SEWERS 1. Dover St. to Lenox S 12" Pipe 15" "	920 310 290 5,000 325 339 140	L. F. L. F. L. F. L. F. L. F.	\$ 3.00 3.50 4.00 5.00 6.00 7.00 15.00	1,085 1,160 25,000 1,950 2,373 2,100 \$36,428

inuoma s	Unit Price	Unit	Quantity	Item	.01
8,525	0.11	Lbs.	77,500	Reinforcing Steel	45
264,550	275.00	Ton	962	Structural Steel (Rolled)	46
910	0.65	Lbs.	1,400	Beam Wrapping	47
53,340	30.00	S. Y.	1,778	Decking- Roadway	48
17,780	20.00	S. Y.	688	" - Sidewalk	49
14,224	8.00	S. Y.	1,778	Restoration - Roadway	50
8,00	9.00	S. Y.	688	" - Sidewalk	51
192,91	100.7	1.57.5	STATE	Waltegrowlling - 5 Ply	5.8
15,925	3.50	S. Y.	4,550	" 4 Ply	53
20, 25	0.30	S. F.	67,530	Concrete Finish	54
44,74	2.80	S.F.	15,980	Tile	55
3,036	6.00	L. F.	506	Railing	56
1,097,13	\$				
				III. VENTILATION	
				Amender Landge person vog Antich for from 1-20 van van de Austrage van Statu-vinge van Antich der van de va	
\$29,250	\$ 4.50	S. F.	6,500	Grating	57
68,080	37.00	C, Y.	1,840	Concrete Masonry	58
6,380	0.11	Lbs.	58,000	Reinforcing Steel	59
	.00 (0)	r.s. _{State}		Raw Albimberry to Significe	10.0
\$121,210					
	CIES	FLIITU	LY OWNED	IV. RELOCATION OF CI	
				A. WATER MAINS	
			, annexigosable		
\$ 2,760	\$ 3.00	L.F.	920	6" Main	61
1,085	3.50	L. F.	310	н на	62
1,160	4.00	L. F.	290	10" "	63
2 2 6 2	5,00	L. F.	5,000	1211 11	64
		L. F.	325	п и91	65
25,000	6.00			DON H	
25,000	7.00	L. F.	339	2011 11	00
25,000 1,950 2,373 2,100		L. F.	339 140	30" "	
25,000	7.00				67

222

313

3,640

1,565

12" Pipe

15"

112

168

169

171

\$ 1,887

14,868

017 31

43,680

L.F. \$ 8.50

L. F.

Tell.

L. F.

9.50

00.51

12.00

No. Item Quantity Unit Price	e Amount
172 24" Pipe 1,285 L. F. 13.00 173 30" " 250 L. F. 15.00 174 72" " 40 L. F. 30.00 175 Sewer Manholes 45 Ea. 200.00 176 " " 10 Ea. 300.00	3,750 1,200
C. SIPHONS	
1. Dover St. To Lenox St.	
177 At West Concord St8'x5' 80 L. F. \$130.00 178 At Camden St8'-3"x8'-5" 80 L. F. 200.00	
D. M. T. A. HIGH TENSION DUCT	
1. Dover St. to Lenox St.	
179 Duct 727 L.F. \$ 2.20 180 Manholes 8 Ea. 200.00	\$ 1,600 1,600 \$ 3,200
v. EQUIPMENT	
A. PUMPS	
181 1 1	\$ 2,000
182 <u>2. Massachusetts Ave.</u> 1 Ea. \$2,000.00	\$ 2,000
B. STATION EQUIPMENT	
183 <u>1. Union Park St. 184 de la la la la la la L.S.</u>	\$22,000
184 2. Massachusetts Ave. L.S.	\$22,000
	\$6,300,470
Contingencies 10%	630,047
Engineering & Administration 10%	693,052 \$7,623,569*

^{*} Does not include cost of: Track work, Power, Signals and Lighting, Land damages, Demolition of Existing Washington St. Elevated and Interest During Construction

e Amount	Unit Pric	Unit	Quantity	Item	No.
16,705	13.00	L. F.	1, 285	24" Pipe	172
3,750	15.00	L. F.	250	30" "	173
1,200	30.00	L. F.	40	72" "	174
9,000	200.00	Ea.	45	Sewer Manholes	175
3,000	300.00	Ea.	10	11 11	176
\$100,800					
				C. LIPHONS	
			it.	1. Dover St. To Lenox S	
\$10,400	\$130.00	L. F.	08	At West Concord St8'x5'	177
16,000	200.00	L. F.		At Camden St8'-3"x8'-5'	178
\$26,400		(t eln Q lissin			
			TOUG H	D. M. T. A. HIGH TENSION	
			ь d **	1. Dover St. to Lenox St	
\$ 1,600	\$ 2.20	L. F.	727	Duct	179
1,600	200.00	Ea.	8	Manholes	180
				V. EQUIPMENT	
				T. CT	
\$ 2,000	\$2,000.00	Ea.	· I	1. Union Park St.	181
\$ 2.000	\$2,000.00	Ea.	Ī	2. Massachusetts Ave.	182
				B. STATION EQUIPMENT	
\$22,000	L. S.			1. Union Park St.	183
\$22.000	L.S.			2. Massachusetts Ave.	184
\$6,300,470 630,047 6,930,517			ry Item N Contingen	Construction Cost - Summa	
693,052	10%	tration l	Adminis	Engineering &	

^{*} For a not include cost of: Track work, Power, Signals and Lighting, Land damages, Demolition of Taissin Whitelest Distriction Interest During Construction

-50-

ESTIMATE

No.	<u>Item</u> <u>Quantity</u>	Unit	Unit Price	e Amount
	I. PRELIMINARY WORK		.•	
185	Borings and Test Pits		L, S.	\$15,750
	II. RAPID TRANSIT CONSTRUCTION	ON		
	A. ST. JAMES ST. TO KINGSBUF	RY		
	ST. (OPEN CUT)	Rijustio		
186	Excavation - 0' to 10' 24,450	C. Y.	\$ 8.75	\$213,938
187	" - over 10 ¹ 21,970	C. Y.	10.75	236, 177
188	- Conglomerate 17, 570	C. Y.	12.00	210,840
189	Concrete Masonry 13,500	C. Y.	37.00	
190	Reinforcing Steel 2, 100, 000	Lbs.	0.11	231,000
191	Decking - Roadway 8,750	S. Y.	30.00	
192	Restoration - Roadway 8,750	S. Y.	8.00	70,000
193	Waterproofing-6 Ply 10,790	S. Y.	5. 20	56, 108
194	4 11 8,560	S. Y.	3.50	29, 960
195	-3 ng mg 4,080	S. Y.	2,70	11,016
			\$	1,821,039
	B. KINGSBURY ST. TO INCLINE(U	JNDER B	UILDINGS)	
196		nation and the state of the sta		\$171, 238
196 197	Excavation - 0' to 10' 19,570	C. Y.		\$171, 238 166, 087
		nation and the state of the sta	\$ 8.75	
197	Excavation - 0' to 10' 19,570 '' - over 10' 15,450 '' - Conglomerate17,550	C. Y. C. Y.	\$ 8.75 10.75	166, 087 210, 600
197 198	Excavation - 0' to 10' 19,570 " - over 10' 15,450	C. Y. C. Y. C. Y.	\$ 8.75 10.75 12.00	166, 087 210, 600
197 198 199	Excavation - 0' to 10' 19,570 '' - over 10' 15,450 '' - Conglomerate 17,550 Concrete Masonry 16,030	C. Y. C. Y. C. Y. C. Y.	\$ 8.75 10.75 12.00 37.00	166,087 210,600 593,110
197 198 199 200	Excavation - 0' to 10' 19,570 '' - over 10' 15,450 '' - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000	C. Y. C. Y. C. Y. C. Y. Lbs.	\$ 8.75 10.75 12.00 37.00 0.11 275.00	166, 087 210, 600 593, 110 207, 900
197 198 199 200 201	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate 17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824	C. Y. C. Y. C. Y. C. Y. Ton Lbs.	\$ 8.75 10.75 12.00 37.00 0.11 275.00	166,087 210,600 593,110 207,900 501,600 3,315
197 198 199 200 201 202	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomeratel 7,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998	C. Y. C. Y. C. Y. C. Y. Ton Lbs.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00	166,087 210,600 593,110 207,900 501,600 3,315
197 198 199 200 201 202 203	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomeratel 7,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940
197 198 199 200 201 202 203 204	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383
197 198 199 200 201 202 203 204 205	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomeratel 7,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383
197 198 199 200 201 202 203 204 205 206	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240 " - 4 " 5,280	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20 3.50	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383
197 198 199 200 201 202 203 204 205 206 207	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomeratel 7,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20 3.50 2.70	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383 53, 248 18, 480 8, 100
197 198 199 200 201 202 203 204 205 206 207 208	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240 " - 4 " 5,280	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20 3.50 2.70	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383 53, 248 18, 480
197 198 199 200 201 202 203 204 205 206 207 208	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240 " - 4 " 5,280 " - 3 " 3,000	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20 3.50 2.70	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383 53, 248 18, 480 8, 100
197 198 199 200 201 202 203 204 205 206 207 208	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240 " - 4 " 5,280	C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20 3.50 2.70	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383 53, 248 18, 480 8, 100
197 198 199 200 201 202 203 204 205 206 207 208	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240 " - 4 " 5,280 " - 3 " 3,000	C. Y. C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20 3.50 2.70	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383 53, 248 18, 480 8, 100
197 198 199 200 201 202 203 204 205 206 207 208 209	Excavation - 0' to 10' 19,570 " - over 10' 15,450 " - Conglomerate17,550 Concrete Masonry 16,030 Reinforcing Steel 1,890,000 Structural Steel (Rolled) 1,824 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 Waterproofing - 6 Ply 10,240 " - 4 " 5,280 " - 3 " 3,000 C. INCLINE AT RITCHIE ST. Excavation - Conglomerate 3,790	C. Y. C. Y. C. Y. C. Y. Lbs. Ton Lbs. S. Y. S. Y. S. Y. S. Y. S. Y.	\$ 8.75 10.75 12.00 37.00 0.11 275.00 0.65 30.00 20.00 8.00 9.00 5.20 3.50 2.70	166, 087 210, 600 593, 110 207, 900 501, 600 3, 315 29, 940 9, 740 7, 984 4, 383 53, 248 18, 480 8, 100 1, 985, 725

ESTIMATE

LENOX ST. TO BEED OF PHILLISE AT REPUBLIED.

sommer A a	Unit Pric	tinU	Item Quantity	No.
RIMOTITY 3	OIL TO A TITLE	Victorial Color	VARIATION SC ALLOSIA	- CONT
			I. PRELIMINARY WORK	
\$15,750	L. S.		Borings and Test Pits	185.
		NC	IL RAPID TRANSIT CONSTRUCTIO	
		(4)	A, ST, JAMES ST, TO SCHOOL ST, JUESS OUT	
\$213,938	\$ 8.75	C.Y.	Excavation - 0' to 10' 24, 450	186
236, 177	10.75	C. Y.	" - over 10' 21,970	187
210,840	12.00	C. Y.	" - Conglornerate17,570	188
499,500	37.00	C. Y.	Concrete Masonry 13,500	189
231,000	0,11	Lbs.	Reinforcing Steel 2, 100, 000	190
262,500	30.00	S. Y.	Decking - Roadway 8,750	191
70,000	8.00	S. Y.	Restoration - Roadway 8,750	192
101597	MEAS	, Y , S	Watergrooting-6 Ply 120	193
29,960	3,50	S. Y.	" 4 " 8,560	194
11,016	2,70	S. Y.	" 4,080	195
080,158,1	\$			
	THE WHOLE STREET			
	HETWICTIDA	NDER	B. KINGSBURY ST. TO INCLINE(U	
000 1519	¢ 0 75	V 7	Franking Olivator 10 570	201
\$171,238	\$ 8.75	C. Y.	Excavation - 0' to 10' 19,570	196
166,087	10.75	C.Y.	" - over 10' 15,450	197
166,087	10.75	C. Y.	" - over 10' 15,450	197
166, 087	10.75	C. Y.	" - over 10' 15,450 " - Complement w/ 1550 Control Maximiry 10,10	197
166, 087 0 .00 207, 900	10,75	C.Y.	" - over 10' 15,450 - Samplamers ver 1550 - Constant version 10 10 10 10 10 10 10 10 10 10 10 10 10	197
166, 087 0 .0 207, 900	10.75	C. Y.	" - over 10' 15,450 " - Ganglamer ve' 1550 " - Steel 1,890,000 Tructu al Steel 1,890,000	197 199 200
166,087 102,000 207,900 500	10, 75 4, 00 0, 11 75 00 0, 65	C. Y. Lbs. Lbs.	Reinforcing Steel 1,890,000 Beam Wrapping 5,100	197 198 199 200 201 202
166,087 ************************************	10.75 0.11 75 00 0.65 30.00	C. Y. Lbs. Lbs. S. Y.	Reinforcing Steel 1,890,000 Beam Wrapping 5,100 Decking - Roadway 998	197 190 200 202 203
166,087 10.00 207,900 50.000 3,315 29,940 9,740	10, 75 0, 11 7, 00 0, 11 30, 00 20, 00	C. Y. Lbs. S. Y. S. Y.	" - over 10' 15,450 Complement of 1550 Reinforcing Steel 1,890,000 Tructural over 10' 15,450 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487	197 198 200 202 203 204
166,087 207,900 3,315 29,940 9,740	10, 75 0, 11 0, 0, 01 0, 65 30, 00 20, 00 8, 00	Lbs. Lbs. S. Y. S. Y.	" - over 10' 15,450 Complement with the standard of the stand	197 190 200 201 202 203 204 205
166,087 10,00 207,900 3,315 29,940 9,740 7,984 4,383	10.75 0.11 75 00 0.65 30.00 20.00 8.00	C. Y. Lbs. S. Y. S. Y. S. Y. S. Y.	" - over 10' 15,450 Complement of 550 Reinforcing Steel 1,890,000 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487	197 198 200 202 203 204 205 205 206
166,087 207,900 3,315 29,940 9,740 4,383	10, 75 0, 11 7, 00 0, 11 30, 00 20, 00 8, 00 9, 00	C. Y. Lbs. S. Y. S. Y. S. Y. S. Y.	" - over 10' 15,450 Complement of 15,000 Reinforcing Steel 1,890,000 Beam Wrapping 5,100 Decking - Roadway 998 Restoration - Roadway 998 " - Sidewalk 487	197 200 202 203 204 205 206 206
166,087 207,900 3,315 29,940 9,740 4,383	10.75 0.11 75 0.0 30.00 20.00 8.00 9.00	C. Y. Lbs. S. Y. S. Y. S. Y. S. Y.	" - over 10' 15,450 Reinforcing Steel 1,890,000 Ream Wrapping 5,100 Decking - Roadway 998 Restoration - Roadway 998 " - Sidewalk 487 " - Sidewalk 487	197 198 200 202 203 204 205 206 206 206
166,087 207,900 3,315 29,940 9,740 4,383	10.75 0.11 75 00 20.00 30.00 8.00 9.00 3.50 2.70	C. Y. Lbs. S. Y. S. Y. S. Y. S. Y.	" - over 10' 15,450 Reinforcing Steel 1,890,000 Ream Wrapping 5,100 Decking - Roadway 998 Restoration - Roadway 998 " - Sidewalk 487 " - Sidewalk 487	197 200 202 203 204 205 206 206
166,087 207,900 3,315 29,940 9,740 7,984 4,383 18,480	10.75 0.11 75 00 20.00 30.00 8.00 9.00 3.50 2.70	C. Y. Lbs. S. Y. S. Y. S. Y. S. Y.	" - over 10' 15,450 Reinforcing Steel 1,890,000 Ream Wrapping 5,100 Decking - Roadway 998 Restoration - Roadway 998 " - Sidewalk 487 " - Sidewalk 487	197 198 200 202 203 204 205 206 206 206
166,087 207,900 3,315 29,940 9,740 4,383 18,480 18,480 18,480	10, 75 0, 11 7, 00 0, 11 20, 00 20, 00 8, 00 9, 00 2, 70	C. Y. Lbs. S. Y. S. Y. S. Y. S. Y. S. Y.	" - over 10' 15,450 Reinforcing Steel 1,890,000 Ream Wrapping 5,100 Decking - Roadway 998 Restoration - Roadway 998 " - Sidewalk 487 " - Sidewalk 487 " - 4 " 5,280 " - 4 " 3,000	197 198 200 202 203 204 205 206 206 206 208
166,087 207,900 3,315 29,940 29,740 7,984 4,383 18,480	10.75 0.11 75 00 20.00 30.00 8.00 9.00 3.50 2.70	C. Y. Lbs. S. Y. S. Y. S. Y. S. Y.	" - over 10' 15,450 Reinforcing Steel 1,890,000 Beam Wrapping 5,100 Decking - Roadway 998 Decking - Sidewalk 487 Restoration - Roadway 998 " - Sidewalk 487 " - Sidewalk 5,280 " - 4 " 5,280	197 198 200 202 203 204 205 206 206 206

No.	<u>Item</u> <u>Quantity</u>	Unit Unit Price Amoun	t
212	Reinforcing Steel 20,520	Lbs. 0.11 2,25	
	III. UNDERPINNINGS		
	telemente entente entre personale de provincia de provinc		
	A. VALENTINE ST. TO MARCEL (BUILDINGS)	LA ST.	
213	Concrete Masonry 480	C.Y. \$ 37.00 \$17,76	0
214	Structural Steel (Temp) 139	Ton 180.00 25,02	20
215	n (Rolled) 25	Ton 275.00 6,87	75
216	Demolition of Concrete 200	C. Y. 55.00 11,00	0 (
217	Timber 128	M.B.M. 200.00 25,60	
218	Maintenance of Buildings	L.S. 6,00	
		\$92, 25	5
	B. ST. JAMES ST. TO VALENTI	NE ST.	
	(ELEVATED COLUMNS)		
219	Excavation 2, 100	C.Y. \$ 8.75 \$18,37	5
220	Concrete Masonry 170	C. Y. 37.00 6,29	
221	Structural Steel (Temp) 714	Ton 180.00 128,52	
222	Demolition of Concrete 1,010		
223	Timber 168		
224	Pipe Piles 4, 200	L. F. 15.00 63,00	
		\$305,33	
	IV. VENTILATION		
225	Grating 6,000	S.F. \$ 4.50 \$27,00	
	Concrete Masonry 1,690	C. Y. 37.00 62,53	
227	Reinforcing Steel 54,000	Lbs. 0.11 5,94	
228	Fan Chambers & Equipment 4	Ea. 17,500.00 70,00	
		\$165,47	0
	V. RELOCATION OF CITY OWNER	HTH.ITIES	
	REBOOMING OF CITT OWNER	, or illiance	
	A. WATER MAINS		
	1. St. James St. to Valentine St		
229	4" Main 640	L.F. \$ 2.50 \$ 1,60	0
230	6" " 60	L. F. 3.00 18	
231	8" " 42	L. F. 3.50 14	
232	12" " 2, 785	L.F. 5.00 13,92	

LENOX ST. TO ENH OF IMPLIES AT SITCHER ST.

	,	**			
ImomA	Unit Price	Jin U	Quantity	Item	•emerano
2, 257	0.11	Lbs.	20,520	Reinforcing Steel	212
				III. DEDERFINADA	
		TRAL	LEDRANE	A, VALENTHE II, TO	
\$17,760	\$ 37.00	C.Y.	480	Concrete Masonry	213
25,020		no T	139	Structural Steel (Temp)	214
6,875	275.00	Ton	25	" (Rolled)	215
11,000	55.00	C. Y.	200	Demolition of Concrete	216
25, 600	100,011 3	A i II i M	11.1	Timber	4 1 5
6,000	L.S.			Maintenance of Buildings	218
#Annibility or do an electrodramine of orgin		Section Sec		As an institute and in	
		171 2	and the same of th	OT STANKES OF THE OTHER OT A THE OTHER OTH	
\$18,375	\$ 8.75	C.Y.	2,100	Excavation	219
6, 290	37.00	C.Y.	170	Concrete Masonry	220
	05 000	10000	615	(min T) Insid Insulation	115
55,550	55.00	C.Y.	1,010	Demolition of Concrete	222
33,600	200.00	M, B, N	168	Timber	223
63,000	15.00	L. F.	4, 200	Pipe Piles	224
				ROLLWIT LAITA AS	
\$27,000	\$ 4.50	S.F.	6,000	Grating	225
62,530	37.00	C. Y.	1,690	Concrete Masonry	226
1117 (2	FF 10	10000	100.46	Recallered ng öle ét	755
\$165,470	17,805,00	, first.	\$ 2.779	Fas Chambers & Equipm	85 h
	10.00	TLUEDA	object of	V. RELOCATION OF CIT	
				A. WATER MAINS	
			15 87 14 11	V at 32 amount 32 A	
\$ 1,600	\$ 2.50	L. F.	640	4" Main	229
180	3.00	L. F.	09	11 119	230
741	67.1	e de glob	1.4		165
11, 525	0.0 . 6:	The state of	837,3	e 4	2.22
	0.000			30.7	

No.	<u>Item</u> <u>Quantity</u>	Unit Unit Price	Amount
233		L.F. 6.00	252 \$16, 104
	2. Valentine St. to Marcella St.		
234	6" Main 45	L.F. \$ 3.00	\$ 135
	3. Marcella St. to Incline		
235	12 ¹¹ Main 70	L.F. \$ 5.00	\$ 350
	B. SEWERS	•	
	1. St. James St. to Valentine St.		
236 237 238	15 ^H H 770	L.F. \$ 8.50 L.F. 9.50 L.F. 11.00	\$16, 745 7, 315 8, 470
239		L.F. 13.00	780
240 241	Sewer Manholes 10 3	Ea. 200.00 Ea. 300.00	2,000 900 \$36,210
	2. Valentine St. to Marcella St.		
, 242	12 ⁿ Pipe 80	L.F. \$ 8.50	\$ 680
	C. SIPHONS		
	1. Valentine St. to Marcella St.		
243	At Thornton St 24" x 18" 80	L.F. \$ 53.00	\$ 4, 240
	VI. EQUIPMENT		i.
	A. PUMPS		
244	1. Dudley St. 1	Ea. \$2,000.00	\$ 2,000
245	2. Marcella St.	Ea. \$2,000.00	\$ 2,000
	B. STATION EQUIPMENT		
246	1. Dudley St.	L. S.	\$22,000

EXMOVEST, TO RIPER BY INCLUSING AT ATTRIBUS AT

				arrand was passed to the	
Javonia	Unit Price	Jin U	Quantity	Item	** \$* ⁷
25.2	6.00	L. F.	42	ó" Main	1 :::
			Marcella St.	2. Valentine St. to A	
\$ 135	\$ 3.00	M. M.	45	m Main	ð 485
			ncline	3. Marcella St. to Ir	
\$ 350	\$ 5.00	I. F.	70	2" Main	I SEE
				B. SEWERS	
			Valentine St.	1. St. James St. to	
\$16,745	\$ 8.50	L. F.	1,970	2" Pipe	1 23
7,315	9.50	L. F.	770	211 31	
8,470	11.00	L. F.	770	н нв	
780	13.00	L. F.	09	4n n	
2,000	200.00	Ea.	10	ewer Manholes	
2,000	300.00	Ea.	3	H H	
\$36,210	00,000	6 30 mgr	C		100
other comment in mariner					
			darcella St.	2. Valentine St. to M	
080 \$	\$ 8.50	L. F.	08	equit ex	I XHE -
				C. Siproce	
			Aarcella St.	i det .te l	
\$ 4,240	\$ 53,00	L.F.	08 ''81 :	x The second transmission is	6 (1)
				rightedupa .	(V)
				A. PUMPS	
\$ 2,000	10.001.24	.63	ī	i. Dattey St.	142
100.5.4	(0.000.32	Ea.	I	2. Marcella St.	243
			THE	STATION EQUIPME	
the second	t en			3, Deliter by	962

No.	Item Quantity Unit Unit Price Amount
	VII. CONSTRUCTION - LENOX ST. TO ST. JAMES ST.
	A. LEGISLATIVE ROUTE
	1. Rapid Transit Construction
•	a. Subway
247	Excavation - 0' to 10' 41,990 C. Y. \$ 8.75 \$367,413
248	" - over 10' 81,040 C. Y. 10.75 871,180
249	- Conglomerate 7,020 C.Y. 12.00 84,240
250	Concrete Masonry 32,770 C. Y. 37.00 1,212,490
251	Reinforcing Steel 3,932,000 Lbs. 0.11 432,520
252	Structural Steel (Rolled) 2,963 Ton 275.00 814,825
253	Beam Wrapping 10,200 Lbs. 0.65 6,630
254	Decking - Roadway 4,755 S. Y. 30.00 142,650
255	" - Sidewalk 790 S. Y. 20.00 15,800
256	Restoration - Roadway 4,755 S. Y. 8.00 38,040
257	" - Sidewalk 790 S.Y. 9.00 7,110
258	Waterproofing - 6 Ply 19,940 S. Y. 5.20 103,688
259	" - 4 " 12,540 S. Y. 3.50 43,890 " - 3 " 7,320 S. Y. 2.70 19,764
260	7,320 S. Y. 2.70 19,764
	\$4,160,240
	b. Dudley St. Station
261	Excavation - 0' to 10' 11,840 C.Y. \$ 8.75 \$103,600
262	" - over 10' 7,550 C. Y. 10.75 81,163
263	- Conglomerate 20,000 C. Y. 12.00 240,000
264	Concrete Masonry 7,420 C.Y. 37.00 274,540
265	Reinforcing Steel 83,000 Lbs. 0.11 9,130
266	Structural Steel (Rolled) 1, 267 Ton 275.00 348, 425
267	Beam Wrapping 1,800 Lbs. 0.65 1,170
268	Decking - Roadway 380 S. Y. 30.00 11,400
269	- Sidewalk 200 S. Y. 20.00 4,000
270	Restoration - Roadway 380 S. Y. 8.00 3,040
271	" - Sidewalk 200 S. Y. 9.00 1,800
272	Waterproofing - 6 Ply 3,950 S. Y. 5.20 20,540
273	- 4 " 6, 130 S. Y. 3. 50 21, 455
274	Concrete Finish 55, 100 S. F. 0.30 16,530
275	Tile 17,000 S.F. 2.80 47,600
276	Railing 500 L. F. 6.00 3,000
277	Escalators L. S. $\frac{282,000}{4(0.303)}$
	$\frac{\$1,\overline{469,393}}{}$

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	A SAME				DAME AND	

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	PET MIN	11:013		, Γ΄ 1. 1. 2. ••••••		
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				TO ST TIMES ST.		
				to the second second second second		
				$\lambda(0,0) = \lambda(0,0) \cdot \lambda(0,0)$	- 4	
			4112/3011	e in the Francisco		
				a. Subway		
				a. Subway		
\$367,413	\$ 8,75	C. Y.	41,990	vation - 0' to 10'	Excar	THE
871, 180	10.75	C. Y.	81,040	- over 10'	11	7 %
84,240	12.00	C. Y.	te 7,020	- Conglomera	н	1.05
1,212,490	37.00	C. Y.	32,770	ete Masonry		250
	71.0	£ 7		incing Cient		25 E
814,825	275.00	Ton	2,963	tural Steel (Rolled)		272
6,630	0.65	Lbs.	10,200	Wrapping		. 6 1.
142,650	30.00	S. Y.	4,755	ng - Roadway		<i>\$</i>
15,800	20.00	S. Y.	790	- Sidewalk		A.A.C.
38,040	8.00	S. Y.		ration - Roadway	Kesto	0.85
7,110	9,00	S. Y.	790	- Sidewalk		7 r s 8 d s
103,688 43,890	5.20	S. Y.	19,940	proofing - 6 Ply - 4 "		0 C A
19,764		S. Y.	12,540 7,320	3 11	11	905
34, 160, 240		.1 .0	02661			9768
Control of the contro	Tr manus maps					
			110	b. Dudley St. Static		
PRO-0112	1 1	14.5		THE REST OF SHEET	A Second	TAK
81,163	10.75	C. Y.		- over 10'	11	262
	12.00	C.Y.		- Conglomerat	11	263
196,875	00.00	W3.	DR.0	ANAMARA MINI	Line 3	3-72
9,130	0.11	Lbs.	83,000	orcing Steel	Reinf	265
FAR-BIA	00 grs	100	165,1	Loodle HT High of the	SACTO	.008
1,170	0.65	Lbs.	1,800	Wrapping	Beam	267
11,400	30.00	S. Y.	380	ng - Roadway		268
000.4	0.0 -02	1/2	200	Elewabil -		**************************************
0.00	041.4	_Y _22	1941	yawkaull manage		3.7.3
1,800	9.00	S. Y.	200	- Sidewalk		271
774 10	07.0		044.47	procling - 5 Ply		272
21,455	3.50	S. Y.	6, 130	11 <u>A</u>	11	273
7(8)	76.0	1.3.8	001.76	daise Tata		216
3,000	00 3	1 .A	000		Tire	270
3,000	6,00	L. F.	500		Railin	276
1,469,393				10.1	57361	THE
C/C 6/C/I 6T						

No.	Item	Quantity	IIni+	Unit Price Amount
140.	Treating	Qualitity	COMMUNICATION	OHITE A LICE AHOUSE
	2. Underpinning			
	a. Lenox St. to St	James St.	(Buildin	gs)
278	Concrete Masonry	1 720	G Y	\$ 37.00 \$ 63,640
279	Structural Steel (Temp)	500	Ton	180.00 90,000
280	" (Rolled)			275.00 24,750
281 282	Demolition of Concrete Timber			55.00 40,150
283	Maintenance of Buildings		IATO DO IATO	L, S, 35,000
	3			\$345, 340
	b. Williams St. to	St. James	St. (Elev	rated Columns)
	# # # # # # # # # # # # # # # # # # #			
284	Excavation	1,460	C. Y.	\$ 8.75 \$12,775
285 286	Concrete Masonry Reinforcing Steel	6 000 ~	Lhc	0 11 660
287	Structural Steel (Temp)	417	Ton	180.00 75,060
288	Demolition of Concrete	590	C. Y.	55.00 32,450
289	Timber			
290	Pipe Piles	2, 450	L. F.	
				\$184,755
	c. Dudley St. Stat	ion (Bús Lo	op Colum	ns)
291	Concrete Masonry	700	C. Y.	\$ 37.00 \$25,900
292	Reinforcing Steel	22, 100		0.11 2,431
293	Structural Steel (Temp)	98	Ton	180.00 17,640
294	Demolition of Concrete			55.00 28,050
295	Timber	78	M. B. M.	200.00 15,600
				\$89,621
	3. Relocation of City	Owned Utili	ties	
	a. Water Mains			
	Assert white-conversion-pump conjugacy constitution in conditions			
296	4" Main	78	L.F.	\$ 2.50 \$ 195
297 298	811 11	266 182	L.F.	
299	10" "			3.50 637 4.00 168
300	12" "			5.00 6,020
301	2411 11	100	L. F.	10.00 1,000
				\$ 8,818

		Let BRITTS			
			ujuman)		
				gamesprate() &	
		- trust at	ment :	at Land In the	
	\$ 37,00	C. Y.	1,720	Concrete Masonry	
00-7 7520		Ton	500	Structural Steel (Temp)	
	180.00	no T	06	(Rolled)	
	0 40 0	C. Y.	730	Demolition of Concrete	JHS
261.01	55,00		459	Timber	535
Self-III		TAT Ser "Ser	, 55	Maintenance of Buildings	105
The last	L. S.				
	Share an open to the first the first the section with the	TO ARCO N. TOWN AND T. CO. Marine PROSESSION AND ARCO.		of the principle of	
	o d	37 7	1,460	xcavation	
CTT SITA	\$ 8.75	C. Y.	081	Concrete Masonry	
	37.00	C.Y.	6,000	Remforcing Steel	
	0, 11	Lbs.	417	Structural Steel (Temp)	1970
	180,00	Ton	590	Demolition of Concrete	
1000	55 00	C, Y.	102	Timber	
		M, B, M,	2,450	Pipe Piies	WAL
	15.00	L, F.	00F ,2		
	(aa	oop Colum	m (Bus L	c. Dudley St. Static	
				The Married	196
	~~ ~ ~ ,	T	22, 100	einforcing Steel	5.93
2, 431	0.17	Lbs.	86	Structural Steel (Temp)	
	180.00	Ton	510	Demolition of Concrete	315
640 88	55,00	C. Y.	78	Timber	
000 21	200.00	M. B. M.	01		
\$89,627					
			International	Ralanation ?	
				COLUMN STATE AND ADDRESS OF	
	\$ 2.50	L. F.	78	4" Main	
	3,00	L. F.	266	11 119	
	3.50	L. F.	182	11 118	
	4,00	L. F.	42	11 1101	
	5.00	L. F.	1,204	11 211	
	10.00	L. F.	100	240 11	
	0 7 3 0 1				

No.	<u>Item</u> Quantity	Unit	Unit	Price Amount
	b. Sewers			
302	8" Pipe 50	L.F.	\$ 7.	00 \$ 350
303	10 ³¹ ¹¹ 50	L.F.		.00 400
304	12 ¹¹ 11 370	L.F.		.50 3,145
305	18" " 550	L.F.		.00 6,050
306	30" " 40	L.F.		.00 600
307		L, F.		.00 30,030
308	54" " 1,430 Supports for 18" x 12" Brick 100	L.F.		
309	Sewer Manholes 7	Ea.		*
310	n n n	Ea.	200 300	
310		Tradt.	300	$ \begin{array}{r} 2,400 \\ \hline $45,375 \end{array} $
				\$40,570
	c. Siphons			
	C. DIDITORS			
311	At Washington St. & Eustis			
	St 10" 80	L.F.	\$ 32.	00 \$ 2,560
			7	
	d. M.T.A. High Tension D	uct		
312	Duct 222	L.F.	\$ 2.	20 \$ 488
313	Manhole	Ea.	200	
				\$ 688
	4. Maintenance of Traffic			
	Acres, professional and an extension of the second and a			
314	a. Flagmen at Dudley St. 2	Yrs.	\$ 12,000.	.00 \$24,000
	B. ALTERNATE ROUTE			
16.	1. Demolition of Buildings at D	Judley St.	Station	
				A
315	Boys Club of Boston 428, 220	C.F.		05 \$21,411
316	U. S. Post Office 485, 940	C.F.		.05 24, 297
317	54 Roxbury St. 55, 320	C.F.		,05 2,766
318	56-58 Roxbury St. 55, 240	C.F.		. 05 2, 762
319	72 H 34,080	C.F.		. 05 1, 704
320	74 " 76, 200	C. F.		3, 810
321	78-82 " 74,820	C.F.	0,	3,741
				\$60,491
	2. Rapid Transit Construction			
	a. Subway			
222	Francisco Ol to 101 FF 100	CV		75 6402 025
322	Excavation - 0^{3} to 10^{3} 55, 180	C. Y.	\$ 8.	75 \$482, 825

	and a property of the	* ***	**	
-1.7		a marin	- 100 0	 ,4

b. Sewers 02 8" Pipe	Amount	Unit Price	finU	Quantity	Item	.oV
10	atter follower in regulation and guarter		Chambigupdes		enopalmoption	
10"					S. Z. D. W. D. G. C.	
10"	\$ 350	\$ 7.00	L. F.	50	8" Pipe	302
12" 370 L. F. 8.50 3.14 8.50 3.14 8.50 1.17 1.00 6.05 6.05	4				100	
18"						
1,430 1,F. 15,00 600 600 754" 1,430 1,F. 21.00 30,030 1,50 1,500 1,0						
1, 430 L. F. 21.00 30,030 Supports for 18" x 12" Brick 100 L. F. 10.00 1,000 Sewer Manholes 7 Ea. 200.00 1,400 10 " " 8 Ea. 300.00 2,400 4. Washington St. & Eustis 80 L. F. \$ 32.00 \$ 2,560 4. M. T. A. High Tension Duct 1 Ea. 200,00 200 4. Maintenance of Traffic 1 Ea. 200,00 \$24.000 4. Maintenance of Traffic 1 Ea. 200,00 \$24.000 4. Maintenance of Traffic 1 Ea. 200,00 \$24.000 5. East 1 East 1 East 2 East 1 Ea. 200,00 \$24.000 5. East 1 East 2						
Supports for 18" x 12" Brick 100						
Sewer Manholes					Supports for 18" x 12" E	
10 " " 8 Ea. 300.00 2,400						
2. Siphons At Washington St. & Eustis St 10" A. M.T. A. High Tension Duct Duct 222 L. F. \$ 2. 20 \$ 488 L. Manhole 1 Ea, 200, 00 200 4. Maintenance of Traffic 2. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 Boys Club of Boston 428,220 C. F. \$ 0.05 \$21,411 L. S. Post Office 485,940 C. F. 0.05 24,29 St. Roxbury St. 55,320 C. F. 0.05 24,39 St. Roxbury St. 55,320 C. F. 0.05 24,39 St. Roxbury St. 76,200 C. F. 0.05 3,74 St. Roxbury St. 76,200 C. F. 0.05 3,810 St. Roxbury St. 76,200 C. F. 0.05 3,810 St. Roxbury St. 76,200 C. F. 0.05 3,74 St. Roxbury St. 74,820 C. F. 0.05 3,74						018
C. Siphons At Washington St. & Eustis St 10" A. M. T. A. High Tension Duct Duct 222 L. F. \$ 2.20 \$ 488 L. Manhole 4. Maintenance of Traffic a. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 Boys Club of Boston 428,220 C. F. \$ 0.05 \$21,411 Boys Club of Boston 428, 220 C. F. 0.05 24,297 L. S. Post Office 485,940 C. F. 0.05 24,297 St. Sc. St. Sc. 276 1 74 " " 34,080 C. F. 0.05 3,74 L. Manhole 1 74,820 C. F. 0.05 3,74 L. Manhole 2 St. S.		7				
At Washington St. & Eustis St 10" A. M. T. A. High Tension Duct Duct 222 L. F. \$ 2.20 \$ 488 Manhole 4. Maintenance of Traffic a. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 Boys Club of Boston 428,220 C. F. \$ 0.05 \$21,411 Boys Club of Boston 428,220 C. F. \$ 0.05 \$21,411 J. W. S. Post Office 485,940 C. F. 0.05 24,200 J. W. S. Post Office 485,940 C. F. 0.05 24,200 J. W. S. Post Office 485,940 C. F. 0.05 24,200 J. W. S. Post Office 485,940 C. F. 0.05 24,200 J. W. S. Post Office 485,940 C. F. 0.05 24,200 J. W. S. Post Office 485,940 C. F. 0.05 24,200 J. W. S. Post Office 485,940 C. F. 0.05 27,700 J. W. S. Post Office 76,200 C. F. 0.05 3,740 J. W.	The agree agreement agreement parties are used to make the control of the control					
St 10" d. M.T. A. High Tension Duct Duct					C. Diphons	
d. M. T. A. High Tension Duct Duct				stis	At Washington St. & Eu	1.2.5
d. M.T. A. High Tension Duct Duct 222 L. F. \$ 2,20 \$ 488 Manhole 1 Ea, 200,00 200 4. Maintenance of Traffic 2. Maintenance of Traffic 3. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 Boys Club of Boston 428,220 C. F. \$ 0.05 \$21,411 Boys Club of Boston 428,220 C. F. \$ 0.05 \$21,411 Boys Club of Boston 428,940 C. F. 0.05 24,29 L. S. Post Office 485,940 C. F. 0.05 24,29 54 Roxbury St. 55,320 C. F. 0.05 2,76 55,320 C. F. 0.05 2,76 172 " " 34,080 C. F. 0.05 3,74 174 " " 76,200 C. F. 0.05 3,810 2. Hapud Transit Construction 2. Hapud Transit Construction 2. Hapud Transit Construction 2. Hapud Transit Construction	\$ 2,560	\$ 32.00	L. F.	08	St 10"	
Puct 222 L.F. \$ 2.20 \$ 488 Manhole 1 Ea, 200,00 200 4. Maintenance of Traffic a, Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 Boys Club of Boston 428,220 C.F. \$ 0.05 \$21,411 U. S. Post Office 485,940 C.F. 0.05 24,297 1 U. S. Post Office 485,940 C.F. 0.05 24,297 1 TS. Roxbury St. 55,320 C.F. 0.05 2,760 1 72 " 34,080 C.F. 0.05 1,703 1 72 " 74,820 C.F. 0.05 3,74 2 Mapud Transit Constraction			+	Tension Dur	dotH A T M b	
## Manhole 1 Ea, 200,00 200 4. Maintenance of Traffic a. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 Boys Club of Boston 428,220 C.F. \$ 0.05 \$21,411 U. S. Post Office 485,940 C.F. 0.05 24,297 A Roxbury St. 55,320 C.F. 0.05 2,760 56-57 heart St. 55,320 C.F. 0.05 2,760 72 " " 34,080 C.F. 0.05 3,810 73 " " 76,200 C.F. 0.05 3,810 74 " " 76,200 C.F. 0.05 3,810 75 " " 74,820 C.F. 0.05 3,810 2. Hapud Transit Construction			13 ·	and died the state of the last	All for district the control of the	
4. Maintenance of Traffic a. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 3. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 3. Boys Club of Boston 428,220 C.F. \$ 0.05 \$21,411 4. Boys Club of Boston 428,220 C.F. \$ 0.05 24,297 5. Post Office 485,940 C.F. 0.05 24,297 5. Post Office 485,940 C.F. 0.05 2,760 5. For the first firs				222		EL
4. Maintenance of Traffic 2. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 3. Flagmen at Dudley St. 2 Yrs. \$12,000.00 \$24,000 3. Boys Club of Boston 428,220 C.F. \$ 0.05 \$21,411 3. Boys Club of Boston 428,940 C.F. 0.05 24,297 3. Fost Office 485,940 C.F. 0.05 24,297 5. Roxbury St. 55,320 C.F. 0.05 2,760 5. T.		200, 00	Ea,	1	Manhole	
24,000 \$24,000						
Boys Club of Boston 428, 220 C. F. \$ 0.05 \$21,411 U. S. Post Office 485,940 C. F. 0.05 24,297				affic	4. Maintenance of Tr	
Boys Club of Boston 428, 220 C. F. \$ 0.05 \$21,411 U. S. Post Office 485,940 C. F. 0.05 24,297 E 54 Roxbury St. 55,320 C. F. 0.05 2,766 E 65 C. F. 0.05 24,767 E 72 " 34,080 C. F. 0.05 1,706 E 74 " 76,200 C. F. 0.05 3,810 E 74 " 74,820 C. F. 0.05 3,744 E 74 " 74,820 C. F. 0.05 3,744 E 74 " 74,820 C. F. 0.05 3,744	\$24,000	\$12,000.00	Yrs.	idley St. 2	a, Flagmen at Dr	11
Boys Club of Boston 428, 220 C.F. \$ 0.05 \$21,411 U. S. Post Office 485,940 C.F. 0.05 24,297				23	N. ALTERNATE ROD	
U. S. Post Office 485,940 C. F. 0.05 24,297		111116	.16 × .31.	und to some	laff to astillarated 11	
U. S. Post Office 485,940 C. F. 0.05 24,297	221 411	20 0 à	77 7	120 220	Power Clash of Booton	18 2 1
54 Roxbury St. 55,320 C.F. 0.05 2,766 2.766						
2. February 2. Feb						
19 72 n n 34,080 C.F. 0.05 1,709 20 74 n n 76,200 C.F. 0.05 3,810 21 78-82 n n 74,820 C.F. 0.05 3,74 22 Namul Transii Construction 2. Namul Transii Construction 3. Sabrury 3. Sabrury 3. Sabrury						
74 " " 76,200 C.F. 0.05 3,810 21 78-82 " " 74,820 C.F. 0.05 3,74 250 40.						
2. Regard Transit Construction					ey 1	
2. Banud Transii Construction a. Subwuy					A 2	
yandad .s	\$60.40	CO . O	, 2 ,	120 621	20-01	2-3
				na Homata,	Z. Bapud Transit Com	
					11 (1 (2) (1) (1 (1) (1 (1) (1) (1) (1) (1) (1)	
22 Excavation - 0' to 10' 55, 180 C. Y. \$ 8.75 Statute					1000 (a.1.00) (c) No. (c)	
		\$ 8.75	C.Y.	55, 180	Excavation - 0' to 10'	5.5

	EENOX 51, TO END OF INCERN.	LI AL ILLL	OIIII DI.	
No.	<u>Item</u> <u>Quantity</u>	Unit	Unit Price	Amount
323	Excavation - over 10 ¹ 47, 140	C. Y.	10.75	506, 755
324	Conglomerate 5, 380	C. Y.		64,560
325	Concrete Masonry 22, 340	C. Y.	37.00	826,580
326	Reinforcing Steel 3, 265, 000	Lbs.		359, 150
327	Decking - Roadway 13,700	S. Y.	30.00	411,000
328	" - Sidewalk 270	S. Y.		5,400
329	Restoration - Roadway 13,700	S. Y.		109,600
330	Sidewalk 270	S. Y.		2, 430
			5. 20	58, 032
331	Waterproofing - 6 Ply 11, 160	S. Y.		
332	n 4 h 12, 870		3.50	45,045
333	¹¹ → 3 ¹² 11, 160	S. Y.	2. 70	30, 132
			<u>\$</u>	2, 901, 509
			-	
	b. Dudley St. Station			
334	Excavation - 0' to 10' 14,620	C. Y.	\$ 8.75	\$127,925
335	over 10 ¹ 26, 230	C. Y.	10.75	281, 973
336	" - Conglomerate 9, 000	C. Y.	12.00	108,000
337	Concrete Masonry 11, 190	C. Y.	37.00	414,030
338	Reinforcing Steel 94, 370	Lbs.	0.11	10,381
339	Structural Steel (Rolled) 1,463	Ton	275.00	402, 325
340	Beam Wrapping 21,060	Lbs.	0.65	13, 689
341	Waterproofing - 6 Ply 3, 350	S. Y.		17,420
342	" - 4" 11,650	S. Y.	3.50	40,775
343	Concrete Finish 100, 830	S. F.	0.30	30, 114
344	Tile 26, 640	S.F.	2. 80	74, 592
345			1.30	
	Roofing 94,600	S.F.		122, 980
346	Railing 2,090	L. F.	6.00	12,540
347	Chain Link Fence 700	L.F.	3.50	2, 450
			<u>\$</u>	1,659,194
	3. Underpinning			
	a. Lenox St. to St. James St.	(Buildin	gs)	
348	Concrete Masonry 90	C. Y.	\$ 37.00	\$ 3,330
349	Structural Steel (Temp) 24		180.00	4,320
	* * * * * * * * * * * * * * * * * * * *	Ton	275.00	1, 100
350	· · · · · · · · · · · · · · · · · · ·		55.00	
351				2, 200
352		M. B. M.	200.00	4,400
353	Maintenance of Buildings		L.S.	2,000
				\$17,350
	b. Bartlett St. to St. James S	st. (Eleva	ted Column	is)

400 C.Y. \$ 8.75 \$ 3,500

354 Excavation

LEGION ST. TO SHE OF MULTIPLE S SPECIAL

a Amount	Unit Price	HAD	Quantity	Item	No.
506, 755	BYSOL	.v.0	42 240	In mater maldaness	ccc
cci anc	12.00	43	47,140	Excavation - over 10 ¹ - Conglomera	323
826,580	37.00	T.D	22,340	Concrete Masonry	3 2 4
0.000	0.11	1962	265,000		326
411,000	30.60	` ?	13,700	Decking - Roadway	327
5,400	20.00	3.3	270	" - Sidewalk	328
109,600	8, 00			Restoration - Roadway	329
2,430	(10) (1)	17.2	270	P - Sidewalk	330
58,032	5. 20	7 8		Waterproofing - 6 Ply	331
041.00 8 20 0	3.50	T	12,870		332
30,132	2.70	17.3	11,160	H E H	333
5,901,500	D		11,100		
to the a construction assume the second	Fig. 1				
			*1	b. Telle St. Mail.	
			-	d find	
\$127,925	7 9	JT 3	14,620	Excavation - 0' to 10'	334
281, 973	10, 75	2.10	26, 230	" - over 101	335
108,000	12,00	AV ID		" - Conglomera	336
414,030	37.00	31.0	11,190	Concrete Masonry	337
10,381	0.11	iasil	94,370	Reinforcing Steel	338
402,325	275.00		100.1	(Exitati) lesis (realistation)	986
13,687	0, 65	VERM	21,060	Beam Wrapping	340
17,420	5, 20	17	3,350	74 74	341
40,775	3,50	40.00	11,650		342
30, 114	0.30	3.2	4/8 (00)		P. Que
74,592	2.80	16	26,640	Tile	344
122,980	1.30	1 1:	94,600	Roofing	345
12,540	6.00	1.1	2,090	Railing	346
2,450	3.50	29.44	700	Chain Link Fence	347
1,659,194					
				S. Bruschkeley	
	Lean		Comment.	at Level Para St.	
	-				
\$ 3,330	\$ 37,00			Companie Massary	248
05.C.1	00,001	۵.	24	Structural Steel (Temp)	349
1,100	275.00	42	4	H (Rolled)	350
2,200	55.00	17.20	40	Demolition of Concrete	. 351
4,400	200.00		22	Timber	352
2,000	20			Maintenance of Buildings	353
\$17,350					
Control of the contro					
15)	ated Column	t. (Elevi		L. DESCRIPTION AS	
m.x/m*2	Photo: are an extension and described association of the control o	age of the addition conditions, the features, who is a consistent of the	<u>.</u>		

THE Emeration AND C.Y. S. S.V.S. ST. LAND

-16-

	DENOX 51. TO	JAD OF IN	CHINE AL	KII CIIIE	
No.	<u>Item</u>	Quantity	Unit	Unit Price	Amount
355	Concrete Masonry	32	C. Y.	37.00	1, 184
356	Structural Steel (Temp)		Ton	180.00	24, 480
357	Demolition of Concrete	200		55.00	11,000
358	Timber	32	M. B. M.		6,400
359	Pipe Piles	800	L. F.	15.00	12,000
33/	a spe a stee	; 000		13.00	\$58,564
					430,301
	4. Relocation of City	Owned Hiti	litias		
	4. Relocation of Oily	owned our	TIPIC 2		
	a. Water Mains				
360	6" Main	155	L.F.	\$ 3.00	\$ 465
361	8 ¹¹ H	80	L.F.	3.50	280
362	10л н	77	L.F.	4.00	308
363	12 ¹¹ 11	670	L. F.	5.00	3,350
364	16 ⁿ "	2,009	L.F.	6.00	12,054
365	24" "	70	L.F.	10.00	700
366	Water Manholes	14	Ea.	200.00	2, 800
300	77 000 1 11 10 10 10 10 10 10 10 10 10 10	• •		200,00	\$19,957
					Management of the contract of
	b. Sewers				
367	10" Pipe	495	L.F.	\$ 8.00	\$ 3,960
368	12 ^H H	970	L.F.	8,50	8, 245
369	15" "	1,160	L.F.	9.50	11,020
370	18" "	2,815	L.F.	11.00	30, 965
371	21" "	635	L.F.	12.00	7,620
372	24 ¹¹ ¹¹	190	L.F.	13.00	2, 470
373	30" "	180	L.F.	15.00	2, 700
374	33" "	365	L. F.	16.00	5, 840
375	36" н	440	L.F.	17.00	7, 480
376	54 ¹¹ ¹⁴	1,105	L.F.	21.00	23, 205
377	78 ¹¹ ¹¹	510	L.F.	30.00	15,300
378	Sewer Manholes	13	Ea.	200.00	2,600
379	н и	44	Ea.	300.00	13, 200
380	10 x 10 Overflow Chambe	r 1	Ea.	2,000.00	2,000
					\$136,605
	c. Siphons				
381	At. Ruggles St 15"	80	L.F.	\$ 40.00	\$ 3,200
382	и и и т – 18п	80	L.F.	44.00	3,520
					\$ 6,720
	d. M.T.A. High	Cension Du	ict		
383	Duct	140	L.F.	\$ 2.20	\$ 308
		-62-			

LINOX ST. TO EAR OF SWILLING AS STEWNS ST.

100	100000000000000000000000000000000000000	ALC: HOUSE		· · · · · · · · · · · · · · · · · · ·	
Limited	DIR POSS	THE THE	Quantity	Item	
1,184	37.00	C.Y.	32	Concrete Masonry	3.7 A.
24,480	180.00		136	Structural Steel (Temp)	
11,000	55.00	C. Y.	200	Demolition of Concrete	441
6,400		B, M	31	Thomas	3.8.6
12,000	15.00		008	Pipe Piles	DEL
Miller				00111 04, 1	
		20:4	fitti bowan	4. Relocation of City O	
		THE DLUI	TTI A TO DITA	C VII AN IIIIII JUIJA (F	
				a. Water Mains	
Ą.	\$ 3.00	L. F.	155	6" Main	2002
.,	3.50	L. F,	08	я на	1
11001	4.00	L. F.	77	101	- de
117.5	5.00	L. F.	670	12" "	1.48
850.50	6,00	L. F.			846
1007	00.01	L. F.	70	2411 11	146
0.0%	200.00	Ea,	14	Water Manholes	996
			The day		
				in a contract of	
				b. Sewers	
989 12 2	\$ 8.00	E.E.	495	10" Pipe	
***	8.50	. i. F.	CTO	1	18.60
355/9 4 4	9,50	1 to 1 to 1	1,160	15" "	reg kij
1.47 (0)	11.00	. is E's	2,815	1811	Car.
	12,00	its H.	635	ZIn w	1 7
074.5	13.00	o H ot	190	2411 11	118
8.07	15.00	. I al	180	30" n	16.48
DAW, N	16.00	in H.	166	= -44	9.5" 8
1, 11	17.00	.H.	440	36п м	250
202 (25	00.15	T.	1,105	54п м	3.V/C
URL AL	30.00	F.	510	7811 11	111
2,800	200.00	Ea.	13	e wer Manholes	3.81
0.018	300.00	Ea.			FTE
DOWNER.	2,000.00	Ea.		10'x 10'Overflow Chamber	3.65
617,0778					
~					
				- E1001E	
	00.8k Z	32.2	OA.	AL Alectes St 12	1188
26.4 J	00	11.42	08	-91	5.1.1
-					
		3	usi coc m	THE ATM A	
400 4	11, 11		#11	FARE.	343

-5-4

I. Including Legislative Route from Lenox St. to St.

James St.

Summary Item Nos. 185-246 \$4,536,270
Summary Item Nos. 247-314 6,330,790
Construction Cost 10,867,060
Contingencies - 10% 1,086,706
11,953,766
Engineering & Administration - 10% 1,195,377
\$13,149,143*

II. Including Alternate Route from Lenox St. to St.

James St.

Summary Item Nos. 185-246 \$4,536,270
Summary Item Nos. 315-383 4,860,698
Construction Cost 9,396,968
Contingencies - 10% 939,697
10,336,665
Engineering & Administration - 10% 1,033,667
\$11,370,332*

^{*} Does not include cost of: Track Work, Power, Signals and Lighting, Land Damages, Demolition of Existing Washington St. Elevated and Interest During Construction

LEMMAN TO EXHIBIT OF AN ADDRESS OF AN ADDRESS OF

ETS ALT , AS A RE-TILL SHOW YOU WILL THE

> The Control of the Control Contingencies - 10%

REPORT OF THE PARTY OF THE PART

Engineering & Administration - 10%

LON LINE 11,953,766 1, 195, 37 \$13,149,143*

. . . BAR SHEETS

Sed vitt vill 705,ERC/L

STRANGESTIR

THERE

LAUREST MAN

Ir ading Alternate Route from Lenox St. to St. II.

SCHOOL STATE OF THE SALES OF TH MALANT SHIP THE PARTY OF Construction Cost Contingencies - 10%

Engineering & Administration - 10%

the late of the second of the second of the second the Hary Land Dongers, Dendillow of Estates; Vertication Sc Elevated and Interest During Construction,

ESTIMATE

END OF INCLINE AT RITCHIE ST. TO FOREST HILLS

No.	<u>Item</u>	Quantity	Unit	Unit Price	Amount
	I. PRELIMINARY WO	RK			
384	Borings and Test Pits			L. S.	\$15,750
	II. DEMOLITION OF B	UILDINGS		,	
	A. COLUMBUS AVE.	BUS TERM	INAL		
385 386 387 388 389 390 391 392 393 394 395 396	1575-77 Columbus Ave 1579-85 Columbus Ave 32-36 Amory St. 40-46 Amory St. 1589 Columbus Ave. 48 Amory St. 1589A Columbus Ave. 60 Amory St. 1641 Columbus Ave. 1647 Columbus Ave. 64 Amory St. 30 Amory St.	8,400 9,920 18,600 81,000 121,500 27,000 22,500 18,300	C. F.	\$ 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05	\$ 5,000 420 496 930 4,050 6,075 1,350 1,125 915 1,200 750 240 \$22,551
	B. RELOCATION OF	AMORY ST.			
397 398	31-33 Amory St. 29 Amory St.	91,800 52,500			\$ 4,590 2,625 \$ 7,215
	C. EMBANKMENT (S	STA 161 + 61	TO WIL	LIAMS ST.)	
399 400	146 Amory St. Barney & Cary Lumber		C.F.	\$ 0.03	\$ 4,158
401	Co. Farrington Manufac-	83,880	C. F.	0.03	2,516
	turing Co.	43,000	C. F.	0.03	1, 290 \$ 7, 964
	D. GREEN ST. BUS	TERMINAL			
402 403	Paint Factory Soap Factory	*	C. F.	\$ 0.05 0.05	\$ 3,750 1,020 \$ 4,770

BELINATE

	paum re	TOTOL	TE DIFE	END OF THE LINE AT PL	
Amount	Unit Price	Unit	phleseti	1 - 1'	-01
			4	A STATE OF THE STA	
\$15,750	I. S.			Borings and Test Pits	384
			ILDINGS	II. DEMOLITION OF BU	
		IAVI	BUS TERM	A. COLUMBUS AVE.	
\$ 5,000	\$ 0.05	C. F.	100,000	1575-77 Columbus Ave.	385
420	0.05	C.F.	8,400	1579-85 Columbus Ave.	386
495	0,05	C.F.	9,920	32-36 Amory St.	387
930	0,05	C.F.	18,600	40-46 Amory St.	388
746 sk-		11.00	100,48	10 Rt Commence desc.	994
6,075	0.05	C. F.	121,500	48 Amory St.	390
1,350	0.05	C, F,	27,000	1589A Columbus Ave.	391
1,125	0.05	C, F.	22,500	60 Amory St.	392
915	0.05	C. F.	18,300	*	393
1, 200	0.05	C. E.	24,000	1647 Columbus Ave.	394
750	0.05	C.F.	15,000	64 Amory St.	395
240	0.05	C.F.	4,800	30 Amory St.	396
where 21 ft has a partly and the middle field and a state of				(
-			TO VEGIN	B. RELOCATION OF A	
			L. S. L. J.		
\$ 4,590	\$ 0.05	C.F.	91,800	31-33 Amory St.	397
2,625	0.05	C. F.	52,500	29 Amory St.	398
	1,75 4844	GALLE OF	1A 4 181 A	C. IMPANISHED INT	
\$ 4,158	\$ 0.03	C.F.	138,600	146 Amory St.	399
				Street Nary Looner	107
2,516	0.03	C. F.	83,880	Co.	
				Farrington Manufac-	107
1, 290	0.03	C. F.	43,000	turing Co.	
			TAIIIALE	DI GREEN BY, BUST	
087.17 2	0.05		0.00,87	Paint Farmer	10=
con,t	40.0		0.010,00	Song Factory	
-1000	-0.0		448146	1,000,16.00 (18000)	£0 e

END OF INCLINE AT RITCHIE ST. TO FOREST HILLS

No. Item Quantity Unit Unit Price Amount
III. RAPID TRANSIT CONSTRUCTION
A. COLUMBUS AVE. STATION
404 Excavation 600 C.Y. \$ 8.75 \$ 5,250 405 Concrete Masonry 3,190 C.Y. 37.00 118,030 406 Reinforcing Steel 65,300 Lbs. 0.11 7,183 407 Structural Steel (Rolled) 361 Ton 275.00 99,275 408 " " (Built Up) 416 Ton 425.00 176,800 409 Beam Wrapping 20,330 Lbs. 0.65 13,215 410 Concrete Finish 18,000 S.F. 0.30 5,400 411 Glass Brick (6" x 6") 8,384 Ea. 1.60 13,414 412 Roofing & Siding 28,360 S.F. 1.30 36,868 413 Railing 900 L.F. 6.00 5,400 414 Chain Link Fence 2,150 L.F. 3.50 7,525
B. ELEVATED SECTION SOUTH OF COLUMBUS AVE. STATION
415 Excavation 190. C. Y. \$ 8.75 \$ 1,663 416 Concrete Masonry 90 C. Y. 37.00 3,330 417 Reinforcing Steel 5,130 Lbs. 0.11 564 418 Structural Steel (Rolled) 21 Ton 275.00 5,775 419 " (Built-Up) 161 Ton 425.00 68,425 420 Service Walk - Timber 14 M. B. M. 200.00 2,800 \$82,557
C. EMBANKMENT SECTION PARALLEL TO N. Y., N. H. & H. R. R. TRACKS
1. Abutment Sta. 161 + 61
421 Concrete Masonry 100 C. Y. \$ 37.00 \$ 3,700 422 Reinforcing Steel 23,900 Lbs. 0.11 2,629 \$ 6,329 \$ 6,329
423 Excavation 1,320 C. Y. \$ 2.00 \$ 2,640 424 Concrete Masonry 500 C. Y. 37.00 18,500 425 Reinforcing Steel 93,550 Lbs. 0.11 10,290 426 Structural Steel (Rolled) 11 Ton 275.00 3,025 427 " (Built-Up) 20 Ton 425.00 8,500 \$42,955

eline year		THE OF INCLUSION AT MOTORICATE	
Unit Price Amount		games D	No.
	Mo	THE ANNUAL PRANSITY CONTRACTOR	
		A. COLUMBUS AVE. STATION	
\$ 8.75 \$ 5,250	C.Y.	Excavation 600	\$.(4)a
37.00 118,030	C. Y.	Concrete Masonry 3,190	201
0.11	Lbs.	Reinforcing Steel 65, 300	806
275.00 99,275	Ton	Structural Steel (Rolled) 361	407
425.00 176,800	Ton	" (Built Up) 416	8.0%
0.65	Lbs.	Beam Wrapping 20,330	OWA
0.30	S. F.	Concrete Finish 18,000	430
1.60	Ea.	Glass Brick (6" x 6") 8,384	858
1.30	S. F.	Roofing & Siding 28, 360	112
6.00	L.F.	Railing 900	7.64
3.50	L. F.	Chain Link Fence 2, 150	414
Odv and			
	H	B. ELEVATED SECTION SOUTH C	
	-	COLUMNIA AVE. STATISM	
		· · · · · · · · · · · · · · · · · · ·	
	and and	Excavation	614
37.00	C. Y.	Concrete Masonry 90	\$1.8
0.11	186.0	$0.11 \neq 0.000 = 0.000 = 0.000 = 0.000$, (4
275.00	Ton	Structural Steel (Rolled) 21	314
	Ton	" (Built-Up) 161	** [].
M. 200,00	M. B. 1	Service Walk - Timber 14	024
		CONTRACTOR PARA	
		L Alexand St., 161 at L	
0.0 T 1 T 0.0 T 0	C.Y.	Concrete Masonry 100	154
PS8 10,0	200	Residenting Steel 21,700	3 14 8
1/2 L (1 - E			
		Z. Atlantas Et. Period	
104 S. Z. 100 S. Z.		tal it	8, ° <u>\$</u>
007_81 00.5%	C.Y.	Concrete Masonry 500	1.6
003_01 11.0	Lbs	Reinforcing Steel 93,550	(" \ ".
60.0 00 455	Ton	Structural Steel (Rolled) 11	,) s, s
00 N N N N N N N N N	Ton	" (Built-Up) 20	TEA

N, FIX(1 S42, USS

END OF INCLINE AT RITCHIE ST. TO FOREST HILLS

No.	Item Quantity Unit Unit Price Amount
	3. Pedestrian Underpass at Minton St.
428 429	Concrete Masonry 56 C.Y. \$ 37.00 \$ 2,072 Reinforcing Steel 10,000 Lbs. 0.11 1,100 \$ 3,172
	4. Boylston St. Bridge
430 431 432 433 434	Excavation 900 C. Y. \$ 2.00 \$ 1,800 Concrete Masonry 430 C. Y. 37.00 15,910 Reinforcing Steel 86,000 Lbs. 0.11 9,460 Structural Steel (Rolled) 12 Ton 2.75 3,300 " (Built-up) 21 Ton 4.25 8,925 \$39,395 \$ 39,395
	5. Green St. Bridge
435 436 437 438	Concrete Masonry 250 C.Y. \$ 37.00 \$ 9,250 Reinforcing Steel 32,000 Lbs. 0.11 3,520 Structural Steel (Rolled) 16 Ton 275.00 4,400 " (Built-up) 27 Ton 425.00 11,475 \$28,645
	6. Abutment at Williams St.
439 440	Concrete Masonry 120 C. Y. \$ 37.00 \$ 4,440 Reinforcing Steel 21,200 Lbs. 0.11 2,332 \$ 6,772
	7. Retaining Walls, etc.
441 442 443 444 445 446 447 448 449 450	Excavation 12,700 C. Y. \$ 2.00 \$25,400 Concrete Masonry 6,250 C. Y. 37.00 231,250 Reinforcing Steel 640,900 Lbs. 0.11 70,499 Fill 92,000 C. Y. 0.50 46,000 Sheeting 13,440 S. F. 3.00 40,320 Chain Link Fence 11,300 L. F. 3.50 39,550 Demolition of Concrete 450 C. Y. 55.00 24,750 Removal of Electric Poles 65 Ea. 10.00 650 Electrical Conduit 6,200 L. F. 2.20 13,640 Removal of Spur Track 1,800 L. F. 1.00 \$493,859

ENGINEE BECAUSE OF THE SECOND ST. TO PROBLEM SO.

- Antonio to	DESCRIPTION	unti	yumano	maif	3
		n St.	. Minto	3. Fotostalai Palerpi	
1,140	\$ 37.00	C. Y.	At 244,39	Concrete Masonry Reinforcing Steel	4.29 4.29
				s. Berina Jt. Svilge	
018,61 038,0 005,5	\$ 2.00 37.00 0.11 2.75 4.25	100		Reinforcing Steel Structural Steel (Rolled)	12.6 12.6 12.6 12.6 12.6 12.6
3/3, (V 2) (3.1, () (3.1, () (3.1, () (3.1, () (3.1, () () () () () () () () () () () () () (\$ 37.00 0.11 275.00 425.00	0,5, 144 744 744	32,000	Reinforcing Steel Structural Steel (Rolled)	418 418 419 418
			ns St.	6. Abutment at William	
MILL I	\$ 37.00	C.Y. Lbs.	120 21,200	Concrete Masonry Reinforcing Steel	916
	37.00 0.11 0.50 3.00 3.50 55.00 10.00 2.20	C Y. L s. C Y. L. L. L. Ea. L. L. F.	10 10)\$ ₁ 2	Excavation Sheeting Removal of Electric F Electrical Conduit	

END OF INCLINE AT RITCHIE ST. TO FOREST HILLS

No.	Item Quantity Unit Unit Price Amount
	D. GREEN ST. STATION
451 452 453 454 455 456 457 458 459 460 461	Excavation 1,200 C. Y. \$ 2.00 \$ 2,400 Concrete Masonry 2,390 C. Y. 37.00 88,430 Reinforcing Steel 272,070 Lbs. 0.11 29,928 Structural Steel (Rolled) 109 Ton 275.00 29,975 " (Built-up) 37 Ton 425.00 15,725 Beam Wrapping 9,480 Lbs. 0.65 6,162 Concrete Finish 14,850 S. F. 0.30 4,455 Glass Brick (8" x 8") 6,480 Ea. 3.00 19,440 Roofing & Siding 22,470 S. F. 1.30 29,211 Chain Link Fence 535 L. F. 3.50 1,872 Railing 420 L. F. 6.00 2,520
	E. ELEVATED SECTION - WILLIAMS ST. TO BROOKLEY RD.
462 463 464 465 466 467	Excavation 670 C.Y. \$ 8.75 \$ 5,863 Concrete Masonry 480 C.Y. 37.00 17,760 Reinforcing Steel 27,290 Lbs. 0.11 3,002 Structural Steel (Rolled) 56 Ton 275.00 15,400 " " (Built-up) 433 Ton 425.00 184,025 Service Walk - Timber 10 M.B.M. 200.00 2,000 \$228,050
	F. STONY BROOK CULVERT
468 469	Culvert 2,500 L.F. \$250.00 \$625,000 Temporary Diversion of Flow L.S. 50,000 \$675,000
	G. BROOKLEY RD. CONNECTION
470 471 472 473 474 475 476 477	Excavation 470 C. Y. \$ 8.75 \$ 4,113 Concrete Masonry 170 C. Y. 37.00 6,290 Reinforcing Steel 10,000 Lbs. 0.11 1,100 Structural Steel (Rolled) 24 Ton 275.00 6,600 """ (Built-up) 64 Ton 425.00 27,200 """ (Temp.) 38 Ton 180.00 6,840 Demolition of Concrete 25 C. Y. 55.00 1,375 Timber 6 M. B. M. 200.00 1,200 \$54,718

SEED OF DESIGNER AT REPORT OF PERSONS HILLS

e Amount	Unit Pric	nett.	yerrana Ci		-MH
		-			1000
			NO.	D. GREEN ST. STATE	
\$ 2,400	\$ 2.00	C.Y.		Karaveling	1 = 1.
88, 430	37.00	C. Y.		Cassesse Idagement	·
29,928	0.11	Lbs.	272,070	Steel	877
SALINA.	275.00	Ton	109	Structural Steel (Rolled)	9-24-
15,725	425.00	ron	p) 37	" (Built-u	381-
6, 162	0.65	Lbs.	9,480	Beam Wrapping	MER
4,455	0.30	S. F.	24,850	Congrete Finlets	45-T
19,940	3.00	Ea.	6,480	Glass Brick (8" x 8")	27.5
29,211	1.30	S.F.		Roofing & Siding	742
1,872	3.50	L. F.	-61.0	Chapter Lank France	045
2,520	6.00	L. F.	420	Kailing	().
12171123					
	7	IAMS ST	ON - WILL	E. ELEVATED SECTI	
				TO ERCOCKLEY RI	
216,6.0	\$ 8,75	V n	670	Excavation	448
	37.00	C. Y.		Concrete Masonry	
1842.8	11.0			Reinforcing Steel	helder.
100,00	275.00			Structural Steel (Rolled)	
CHAPT		Ton		" (Built-u	
201.5		M.B.1		Service Walk - Timber	YOR
1/11/54	30,000 91	- 0 - 0 - 1			
			LVERT	F. STONY BROOK CU	
\$625,000	in the said	9.0	2,500	Culvert	Nove.
50,000	8.1				DEF
\$675,000			77 2	io iioiio vae (ao io qui o a	
		11		CL BRIDGHLES NO. C	
Arou t	613	25.03	470	Excavation	DTA
2000	37.00	C. Y.	012	.c.xcavation	374
	11.0		10,000	Reinforcing Steel	228-
	275.00	no T		Structural Steel (Rolled)	
	425.00	Ton		11 (Built-u	176
11111.1	180.00	noT		" (Temp.)	
Mr) _	55.00	C.Y.	25	Demolition of Concrete	ATA
	M. 200.00		9	Timber	774
STEVENS.					

END OF INCLINE AT RITCHIE ST. TO FOREST HILLS

No.	Item Quantity Unit Price Amount
	IV. RELOCATION OF CITY OWNED UTILITIES
	A. SEWERS
478	1. 2'-0" x 3'-6" Sewer of Stony Brook Culvert 2,500 L.F. \$ 32.40 \$81,000
	V. EQUIPMENT
	A. STATION EQUIPMENT
479	1. Columbus Ave. \$22,000
480	2. Green St. 5 22,000
	VI. MAINTENANCE OF TRAFFIC
481	1. Flagmen at Brookley Rd. 2 Yrs. \$12,000.00 \$24,000
	Construction Cost - Marie Construction Cost
	Summary Item Nos. 384-481 \$2,587,180
	Contingencies - 10% 258,718 2,845,898
	Engineering & Administration - 10% 284,590 \$3,130,488*

^{*} Does not include cost of: Track Work, Power, Signals and Lighting, Land Damages, Demolition of Existing Washington St. Elevated and Interest During Construction.

END OF INCLINE AT RITCHILLOT TO FOREST HISLS

Amount	Unit Price	JinU	Quantity	Item		No.
	PRINCIPAL PRINCI	TLHTU (OWNEL	0 K017A20J21	1 71	
				202 87	<u>.</u>	
100,752	03-31-8	71	er of 0000	-0" x 3"-6" Sew		374
					2 · · ·	
			ENT	TATION EQUIPM	A. S	
\$22,000	L. S.			Columbus Ave.	1.	479
\$22,000	L. S.			Green St.	.2	480
			OF TRAFFIC	MAINT ENANCE	IV .IV	
	00,000:21	Ç	2 3A ville	issis de la la partir	, 1	1 83 A.
			ion Cost -	Construct		
,587,180	\$2	384-481	ry Item Nos.			
258,718			encies - 10%			
2,845,898						
284, 590		ration - I	ng & Administ	Engineeri		
,130,488*						

^{*} Does not include cost of: Track Work, Power, Signals and Lighting, Land Damages, Demolition of Existing Washington St. Elevated and Interest During Construction.

ESTIMATE

MISCELLANEOUS ITEMS

No.	Item Quantity Unit Unit Price Amount
	I. DEMOLITION OF EXISTING WASHINGTON ST. ELEVATED
482 483	Removal of Structural Steel 11, 100 Ton \$ 60.00 \$666,000 Credit for Scrap 11, 100 Ton 40.00 \$222,000
	II. LEGISLATIVE ROUTE
484 485 486	1. Track Work 2. Power 3. Signals & Lighting 4. S. \$870,550 4. S. 1,133,600 4. S. 1,218,000 \$3,222,150
487	4. Land Damages \$1,202,170
	III. ALTERNATE ROUTE
488 489 490	1. Track Work 2. Power 3. Signals & Lighting 4. S. \$832,880 4. S. 1,102,600 4. S. 1,218,000 53,153,480
491	4. Land Damages L.S. \$1,262,420

THE PROPERTY OF THE PER

ce Amount	Unit Pri	d .	quitorial	<u> Mete</u>	
	900		AW DIGITAL D	O HULLSONING T	
44	40,00	Ton		Credit for Scrap	
			aruqu	II LECISLATIVE	
000_815 000_815 001_315_64	L. S. L. S.		47.	1. Track Work 2. Power	121- 121 121
010,000,00				4. Land Damage	179.0
1000,000 1000,000 1100,000 1100,000 1100,000	L. S. L. S.		hting	1. Track Work 2. Power 3. Signals & Ligi	418 490
014,175,15	L. S.		8	4. Land Damage	491

SUMMARY

Nos.	Item	Amount	Total
	I. PRELIMINARY WORK		
1 116 185 384	Borings and Test Pits	\$ 4,500 9,000 15,750 15,750	\$ 45,000
	II. DEMOLITION OF BUILDING	GS	
385-396 397-398 399-401 402-403	Columbus Ave. Bus Terminal Relocation of Amory St. Embankment Section Green St. Bus Terminal	22,551 7,215 7,964 4,770	42,500
	III. RAPID TRANSIT CONSTRU	JCTION	
2-11 12-20 21-33	Boylston St. Connection Dore St. to Oak St. Compton St. to Dover St.	254, 425 794, 481 558, 796	
117-125 126-141 142-156	Dover St. to Lenox St. Union Park St. Station	3,744,288	
186-195 196-209	St. James St. to Kingsbury St. Kingsbury St. to Incline	1,821,039	
210-212 404-414 415-420	Incline at Ritchie St. Columbus Ave. Station Elevated Section South of	66, 977 488, 360	
421-450	Columbus Ave. Station Embankment Section Parallel to N. Y., N. H. & H.	82, 557	
451-461	R. R. Tracks Green St. Station	621,127 230,118	
462-467	Elevated Section - Williams St. to Brookley Rd.	228, 050	
468-469 470-477	Stony Brook Culvert Brookley Rd. Connection	675,000 54,718	13,816,805
	IV. UNDERPINNING		
34-39 213-218 219-224	Cobb St. to Dover St. (Building Valentine St. to Marcella St. "St. James St. to Valentine St.	s) 158,745 92,255	
61 / GG1	(Elevated Columns)	305,335	556,335

CHAMNES

		Beer	intel [®]
		ARCHINIMACON OF	
	4,500	Deployment Ten Pila	,
	0.00	0 0 0	-017
	US. TNO	(1) 17 11 10	(20)
\$ 45,000	0.63,121	0 00 (1) 0	490
	an	II. DEMOLITION OF BUILDING	
	22,551	Calemany Are, Test Testinal	116-00
	7, 215	Relocation of Amory St.	MIESTYZ
	7,964	Enths above at Smill on	
42,500	art is	Green St. Bus Terminal	E100 = 2114
	(40,000)	III. BAPIN TRABUT CONSTRU	
	254, 425	Boylston St. Connection	2-11
	794,481	Dore St. to Oak St.	12-20
	558,796	Compton St. to Dover St.	21-33
	3,744,288	Dover St. to Lenox St.	117-125
	1,114,011	Union Park St. Station	126-141
	1,097,133	Massachusetts Ave. Station	142-156
	1,821,039	St. James St. to Kingsbury St.	186-195
	1,985,725	Kingsbury St. to Incline	196-209
	66,977	Incline at Ritchie St.	210-212
	488,360	Columbus Ave. Station	404-414
		Elevated Section South of	415-420
	82,557	Columbus Ave. Station	
		Embankment Section Parallel	421-450
		to N. Y., N. H. & H.	
	621,127	R. R. Tracks	
	230,118	Green St. Station	451-461
		Elevated Section - Williams	462-467
	228,050	St. to Brookley Rd.	
	675,000	Stony Brook Culvert	468-469
13,816,805	54,718	Brookley Rd. Connection	470-477
		IV. UMDEREDVENO	
	211,000 11	Calls St. Id Doyer St. [11] Ling	97-8-E
	92, 255	Valentine St. to Marcella St. "	213-218
		St. James St. to Valentine St.	219-224
000,000	305,335	(Elevated Columns)	

SUMMARY

Nos.	<u>Item</u>	Amount	Total
	v. <u>VENTILATION</u>		
40-43	Existing Boylston Station to	E0 730	
157-160	Dover St. Dover St. to Lenox St.	58,720 121,210	
225-228	Lenox St. to Incline at Ritchie		345,400
			•
	VI. RELOCATION OF CITY C	WNED UTILITIES	
	A. WATER MAINS		
44-46	Boylston St. to Warrenton St.	12, 284	
47-52	Warrenton St. to Dover St.	4,632	
161-167	Dover St. to Lenox St.	36,428	
229-233	St. James St. to Valentine St.	16, 104	
234	Valentine St. to Marcella St.	135	
235	Marcella St. to Incline	350	69,933
	B. SEWERS		
53-57	Boylston St. to Warrenton St.	18,920	
58-63	Warrenton St. to Dover St.	5,000	
168-176	Dover St. to Lenox St.	100,800	
236-241	St. James St. to Valentine St.	36, 210	
242	Valentine St. to Marcella St.	680	
478	2'-0" x 3'-6" Sewer of Stony		
	Brook Culvert	81,000	242,610
	C. SIPHONS		
		4 000	
64	Boylston St. to Warrenton St.	4,880	
177-178	Dover St. to Lenox St.	26, 400	25 520
243	Valentine St. to Marcella St.	4, 240	35,520
	D. FIRE MAINS		
65	Boylston St. to Warrenton St.	17,413	17,413
	E. M.T.A. HIGH TENSION I	DUCT	
66	Warrenton St. to Dover St.	924	
179-180	Dover St. to Lenox St.	3, 200	4, 124
			-

		ţ	
lsto'T	Amount	Item	Nos.
		V. VENTILA CE	
		Philippings promy government and transverse approximation of the control of the c	
		Existing Boylston Station to	40-43
	58,720	Dover St.	
	101 101	D - + 21 1 1 1 2 2	U. L. East
345,400	St. 165, 470	Lenox St. to Incline at Ritchie S	225-228
100	171111111111111111111111111111111111111	VL RESIDORTERS DE LETTE D	
		SKIAM MYTAW A	
	12, 284	Boylston St. to Warrenton St.	44-46
	4,632	Warrenton St. to Dover St.	47-52
	36,428	Dover St. to Lenox St.	161-167
	16,104	St. James St. to Valentine St.	229-233
	135	Valentine St. to Marcella St.	0.61
69,933	350	Marcella St. to Incline	417
		INSTAL A	
	18,920	Boylston St. to Warrenton St.	12-11
	5,000	Warrenton St. to Dover St.	2.1
	100,800	Dover St. to Lenox St.	0T1-341
	36, 210	St. James St. to Valentine St.	$[i++i\cdot]$
	089	Valentine St. to Marcella St.	2.15
		2'-0" x 3'-6" Sewer of Stony	NY 6
242,610	81,000	Brook Culvert	
		d, parations	
	1. 1. 1	Distribution for the state of the	2.1
	334-75	Down St. In Lorens 14.	AFE-STE
35,520	4,240	Valentine St. to Marcella St.	1.65
		D. FYEE HAINS	
17,413	17,413	Replace St. to Warrenton St.	
	3211	E. M.T.A. JUGH TERSION D	
	924	Watterlon Mr. to Dover M.	A.9
4,124	3,200	Dayler Hu, he Leyson din	5.1(+57)

SUMMARY

Nos.	Item Amount Total
	VII.EQUIPMENT
	A. PUMPS
182	Corning St. 10,000 Union Park St. 2,000 Massachusetts Ave. 2,000 Dudley St. 2,000 Marcella St. 2,000 18,000
	B. STATION EQUIPMENT
184 246 479	Union Park St. 22,000 Massachusetts Ave. 22,000 Dudley St. 22,000 Columbus Ave. 22,000 Green St. 22,000 110,000
	VIII. MAINTENANCE OF TRAFFIC
	Flagmen at Boylston St. 24,000 " Brookley Rd. 24,000 48,000
482-483	IX. DEMOLITION OF EXISTING WASHINGTON ST. ELEVATED 222,000
	Summary Item Nos. 1-68, 116-246, 384, 483 \$15, 573, 640
	X. CONSTRUCTION - OAK ST. TO COMPTON ST.
	A. OPEN CUT METHOD UNDER N. Y., N. H. & H. & B. & A. R. TRACKS
69-81 82-87 88-91	Rapid Transit Construction \$1,690,800 Underpinning Buildings 99,545 " N. Y., N. H. & H. & B. & A. R. R. Tracks 141,350 Underpinning Retaining Walls 31,623 \$1,963,318
	B. SHIELD DRIVEN TUNNEL ALTERNATE UNDER N. Y., N. H. & H. & B. & A. R. R. TRACKS
95-106 107-115	

-72-

SHEET WARRA

1491	HARMAN	(0.00)	19.00
		Chambanementa	
		A. PUMPS	
	10,000	Corning St.	67
	2,000	Union Park St.	181
	2,000	Massachusetts Ave.	182
	1111/2	Thatte lies	241
18,000	2,000	Marcella St.	245
		Delikings knowne in	
	22,000	Union Park St.	581
	22,000	Massachusetts Ave.	2-8.0
	22,000	Dudley St.	
	22,000	Columbus Ave.	479
110,000	22,000	Green St.	480
	RAFFIC	VIII. MAINTENANCE OF T	
	24,000	Flagmen at Boylston St.	88
48,000	24,000	" Brookley Rd.	481
000 505		SEASON OF STREET	(0.10)
222,000		WASHINGTON ST. MIN	
MAILTELE I	110,000,000,000	Section Non- 1 ship	
	OY 78	E. COURTROCTION - OAK COLLETON ST.	
		A. DPENCUS MEVALUE V	
	\$1,690,800	Rapid Transit Construction	18-69
	99,545	Underpinning Buildings	82-87
	141 250	" N. Y. , N. H. &	16-88
\$1,963,318	141,350	H. & B. & A. R. R. Tracks	0.0 0.0
41, 703, 310	s 31,623	Underpinning Retaining Wall	92-94
	TARRESTAN LITE	THUS SHEET PRINCIPLE OF	
	3.63,02	The Contract of the Contract o	
			95-106

-72-

SUMMARY

Nos.	Item Amount	Total
	XI. CONSTRUCTION - LENOX ST. TO ST. JAMES ST.	
	A. LEGISLATIVE ROUTE	
247-260	Rapid Transit Construction - Subway 4, 160, 240	
261-277	Rapid Transit Construction - Dudley St. Station 1,469,393	
278-283 284-290	Underpinning - Buildings 345,340 - Elevated Columns 184,755	
291-295	- Dudley St. Station (Bus Loop Columns) 89,621	
296-301	Relocation of City Owned Utilities- Water Mains 8,818	
302-310	Relocation of City Owned Utilities- Sewers 45,375	
311	Relocation of City Owned Utilities- Siphons 2,560	
312-313	Relocation of City Owned Utilities- M. T. A. High Tension Duct 688	
314	Maintenance of Traffic 24,000	6,330,790
	B. ALTERNATE ROUTE	
315-321	Demolition of Buildings at Dudley St. Station \$ 60,491	
322-333	Rapid Transit Construction - Subway 2,901,509	
334-347	Rapid Transit Construction - Dudley St. Station 1,659, 194	
348-353 354-359	Underpinning - Buildings 17,350 "Elevated Columns 58,564	
360-366	Relocation of City Owned Utilities- Water Mains 19,957	
367-380	Relocation of City Owned Utilities- Sewers 136,605	
381-382	Relocation of City Owned Utilities- Siphons 6,720	
383	Relocation of City Owned Utilities- M. T. A. High Tension Duct 308	4,860,698

Total		(rest)	-16
	-170.1	SHEEL SHOTTON EXAMPLE TO	
		SARON SALANDOSTI TV	
	4, 160, 240	Rapid Transit Construction - Subway	- v
	1,469,393	d Transit Construction - Dudley St. Station	
	345,340 nns 184,755	Underpinning - Buildings " - Elevated Colum	125-815 195-885
	ion 89,621	" - Dudley St. Stat	MH-LHC
	8,818	Relocation of City Owned Utilit Water Mains	1272415
	45,375	Relocation of City Owned Utility Sewers	HILLAND
	2,560	Relocation of City Owned Utility Siphons	110
	688	Relocation of City Owned Utility M. T. A. High Tension Duct	100000
6, 330, 790	24,000	Maintenance of Traffic	
		B. ALTERNATE ROUTE	
	\$ 60,491	Demolition of Buildings at Dudley St. Station	315-321
	2,901,509	Rapid Transit Construction -	171-116
	1,659,194	Sapid Tracest Countrations	134-341
	17,350	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1
	19,957	terocation of City Owned Utility Water Mains	360-366
	136,605	'clocation of City Owned Utilit	WE WI
	6,720	Siphons	381-382
4,860,698	_140	M.T.A. High Tenning	383

SUMMARY - LEGISLATIVE ROUTE

I. Including Open Cut Method Under N. Y., N. H. & H. & A. B. & A. R. Tracks

Nos.	Item Amount
1-68, 116-2	246, 384-483
69-94	Open Cut Method Under N. Y., N. H. & H. 1,963,318
	& B. & A. R.R. Tracks
247-314	Legislative Route - Lenox St. to St. James St. 6, 330, 790
484-486	Track Work, Power, Signals & Lighting 3, 222, 150
	27,089,898
	Contingencies - 10% 2,708,990
	29, 798, 888
	Engineering & Administration -10% 2,979,889
487	Land Damages 1, 202, 170 33, 980, 947
	Interest During Construction 987,000
	Total \$34,967,947
	Rounded Total \$35,000,000

II. Including Shield Driven Tunnel Alternate Under N. Y., N. H. & H. & B. & A. R. R. Tracks

Nos.	Amount Amount
1-68, 116-	246,384+483 \$15,573,640
95-115	Shield Driven Tunnel Alternate Under N. Y.,
	N. H. & H. & B. & A. R. R. Tracks 2,719,635
247-314	Legislative Route - Lenox St. to St. James St. 6, 330, 790
484-486	Track Work, Power, Signals & Lighting 3, 222, 150
	27, 846, 215
	Contingencies - 10% 2, 784, 622
	30, 630, 837
	Engineering & Administration -10% 3,063,084
	33,693,921
487	Land Damages 1, 202, 170
	34, 896, 091
	Interest During Construction 1,013,000
	Total \$35,909,091
	Rounded Total \$3.6,000,000

SUMMARY - LEGINLANIVE REUTE

1. Desimilar Over Cut Meded Over N. Y., M. H. E. H.

Amount	Item	Nos.
\$15,573,640	246, 384-483	1-68, 116-
1,963,318	Open Cut Method Under N. Y., N. H. & H. & B. & A. R. R. Tracks	69-94
St. 6, 330, 790	Legislative Route - Lenox St. to St. James	247-314
3,222,150 27,089,898	Track Work, Power, Signals & Lighting	484-486
2, 708, 990 29, 798, 888	Contingencies - 10%	
10% 2,979,889	Engineering & Administration -	
33,980,947	a v zasasa na wakana	Tille
987,000	Interest During Construction	
\$34,967,947	Total	
\$35,000,000	Rounded Total	

Il including their Francis Al. 11. 1. 1. Marks N. H. & B. & A. R. R. Tracks

AmomA	Item	Nos.
\$15,573,640	16, 384+483	1-68, 116-24
2,719,635	N. H. & H. & B. & A. R.R. Tracks	311-49
St. 6, 330, 790	Legislative Route - Lenox St. to St. James	
27, 846, 215	Year Work, Fower, Signals a Lighting	364-364
2, 784, 622	Contingencies - 10%	
30,630,837	Engineering to Administration :	
33,693,921	Land Damages	487
34,896,091		
1,013,000	Interest During Construction	
\$35,909,091	T otal	
\$36,000,000	1000T believed.	

SUMMARY - ALTERNATE ROUTE

I. Including Open Cut Method Under N. Y., N. H. & H. & B. & A. R. R. Tracks

Nos.	em Amount
1-68, 116-246, 384-483	10
69-94 Open Cut Method	· · · · · · · · · · · · · · · · · · ·
	1,963,318
315-383 Alternate Route -	Lenox St. to St. James St. 4,860,698
488-490 Track Work, Pow	ver, Signals & Lighting 3, 153, 480
	25, 551, 136
	Contingencies - 10% 2,555,114
	28, 106, 250
Engineering	g & Administration -10% 2,810,625
	30, 916, 875
491	Land Damages 1, 262, 420
	32, 179, 295
Interest Du	ring Construction 935,000
	Total \$33, 114, 295
	Rounded Total \$33, 200, 000

II. Including Shield Driven Tunnel Alternate Under N. Y., N. H. & H. & B. & A. R. R. Tracks

Nos.	<u>Item</u>	Amount
1-68, 116-2	246, 384-483	\$15,573,640
95-115	Shield Driven Tunnel Alternate Under	
	N.Y., N.H. & H. & B. & A. R.R. Track	s 2,719,635
315-383	Alternate Route - Lenox St. to St. James	St. 4,860,698
488-490	Track Work, Power, Signals & Lighting	3, 153, 480
		26, 307, 453
	Contingencies - 10%	2,630,745
		28, 938, 198
	Engineering & Administration - 10%	2, 893, 820
		31, 832, 018
491	Land Damages	1, 262, 420
		33,094,438
	Interest During Construction	961,000
	Total	\$34,055,438
	Rounded Total	\$34,100,000

SUMMARY ALTERNATE ROOTE

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Chia Evalli	1.00 - 100 - 110 -	1-11,115
	Francisco Benerry, V., M. III. to St.	10-09
1,963,318	& B. & A. R. R. Tracks	
EVG., 148, 2	Allertone Rocks of Level 31, 18 69, January IA.	181-011
000,101,5	Truck Verbi Nover, Signala & Lighting	$\{(\varphi_i)_{i\in I}: i\in I_i\}$
001,100,02		
2,555,114	Contingencies - 10%	
28, 106, 250		
2,810,625	Engineering & Administration -10%	
30,916,875		
1, 262, 420	Land Damages	491
32, 179, 295		
935,000	Interest During Construction	
SECTION AND		
622 200 000	Rounded Total	
\$33, 200, 000	Nodaded rotar	
	Lies Missis Divise Tunnel Junes sans Bales N. Y.	11, 142.00
	N. H. & H. & B. & A. R. R. Tracks	
	N.H. & H. & B. & A. R.R. Tracks	III. testad
	N.H. & H. & B. & A. R.R. Tracks	III. Garian
	N.H. & H. & B. & A. R.R. Tracks	
	N.H. & H. & B. & A. R.R. Tracks	- Miles
April 10 miles	N.H. & H. & B. & A. R.R. Tracks	- Miles
Investó	N.H. & H. & B. & A. R.R. Tracks	-011,01-1
	N.H. & H. & B. & A. R.R. Tracks	-011,01-1
	N.H. & H. & B. & A. R.R. Tracks	1-16,1(0- 95-118
	N.H. & H. & B. & A. R.R. Tracks	1-46,1(0- 95-118
	N.H. & H. & B. & A. R.R. Tracks	1-46,1(0- 95-118
	N.H. & H. & B. & A. R.R. Tracks Contingencies - 10%	1-46,1(0- 95-118
	N.H. & H. & B. & A. R.R. Tracks	1-46,1(0- 95-118
	N.H. & H. & B. & A. R.R. Tracks Contingencies - 10% Engineering & Administration - 10%	-144 11-80 11-80 181-84 001-460
	N.H. & H. & B. & A. R.R. Tracks Contingencies - 10%	1-46,100
	N.H. & H. & B. & A. R.R. Tracks Contingencies - 10% Engineering & Administration - 10% Land Damages	-144 11-80 11-80 181-84 001-460
	N.H. & H. & B. & A. R.R. Tracks Contingencies - 10% Engineering & Administration - 10%	-144 11-80 11-80 181-84 001-460
	N. H. & H. & B. & A. R. R. Tracks Contingencies - 10% Engineering & Administration - 10% Land Damages	-144 11-80 11-80 181-84 001-460
	N.H. & H. & B. & A. R.R. Tracks Contingencies - 10% Engineering & Administration - 10% Land Damages	-144 11-80 11-80 181-84 001-460
	N. H. & H. & B. & A. R. R. Tracks Contingencies - 10% Engineering & Administration - 10% Land Damages	-144 11-80 11-80 181-84 001-460

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We have endeavored to prepare a complete preliminary design of the proposed new Washington Street rapid transit facility. The work covered by this report is in fulfillment of the requirements of the "Preliminary Phase" but it is in greater detail than might be required by the terms of the contract.

While some difficult problems have been encountered, we feel that practical and economical solutions have been reached in all cases.

We trust that our report, plans and estimate will meet with
your approval but we will make such changes as may be deemed
desirable after you have had an opportunity to study these documents.

Respectfully submitted

PRAEGER-MAGUIRE

AND
SINGSTAD & BAILLIE

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The proposed new Wall-pine in set or and in really and the court of the proposed new Walling and the contract of the result of the result of the by the terms of the contract.

The property problems have been expressed, we feel an expressed and the state of the problems and economical and the problems have been reached as all cases.

We trust that our report, plans and estimate will meet with

Respectfully submitted

PRAEGER-MAGUIRE

APPENDIX

Preliminary Drawings

Alternate Drawings

Supplementary Drawings

M.T.A. Drawings

APPENDIX

or positive and many

Alternate Drawings

supplementary Benefits

M. T. A. Drawings

PRELIMINARY DRAWINGS

	P	lan	No	a
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Title

1.	Filing Plan - Le	gislative Route	
2.	Key Plan	17 TE 2 TE 2	
3.	Alignment-Static)
4.	n marine in the second	15 + 00 11 136 + 4	7
5.	11 11	36 + 47 " 58 + 47	7
6.	11 11	58 + 47 11 78 + 35	5
7.	11 11	78 + 35 " 92 + 56	Legislative Route
8.	11 11	92 + 56 11 106 + 62	-
9.	н п	106 + 62 11 116 + 47	7 and the state of the state of
10.	11 11	115 + 00 11 127 + 00	
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13.	11 11	151 + 70 " 155 + 01	
14.	11 11	155 + 01 " 158 + 72	
15.	11 11	158 + 72 " 162 + 85	
16.	11 11	162 + 85 11 165 + 45	
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20.	, и и	176 + 03 11 179 + 64	
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23.	11 11	187 + 17 " 190 + 96	
24.	11 11	190 + 96 11 194 + 55	
25.	11 11	194 + 55 " 198 + 29	
26.	H 11	198 + 29 1 201 + 87	
27.	11 11	201 + 87 " 205 + 47	
28.	ft tt	205 + 47 11 209 + 18	
29.	н н	209 + 18 " 212 + 88	
30.	11 11	212 + 88 11 216 + 86	
31.	11 11	216 + 86 " 221 + 06	
32.	11 11	221 + 06 " 224 + 67	
33.	31 11	224 + 67 " 228 + 69	
34.	Profile-Station	2 + 30 " 15 + 30	
35.	11 11	15 + 30 " 36 + 00	
36.	m m	36 + 00 11 57 + 00	
37.	H 11	57 + 00 11 78 + 00	
38.	11 11	78 + 00 11 2 99 + 00	Legislative Route
39.	11 11	99 + 00 11 120 +00	•
40.	11 11	120 + 00 11 141 +00	
41.	11 H	141 + 00 " 151 + 70	
42.	11 11	151 + 70 11 161 +61	
43.	11 11	161 + 61 " 175 +58	
44.	11 11	175 + 58 " 190 + 00	
45.	11 11	190 + 00 11 197 + 15	
46.	11 11	197 + 15 11 206 + 43	

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1. Filing Plan - Legislative Route 2. Key Plan 3. Alignment-Station 2 + 30 To 15 + 00 4. " " 15 + 00 " 36 + 47" 55. " " 36 + 47" 58 + 47 7. " " 78 + 35 " 92 + 56 Legislative Route 8. " " 92 + 56 " 106 + 62 " " 9. " " 115 + 00 " 127 + 00 10. " " 115 + 00 " 127 + 00 11. " " 127 + 00 " 127 + 00 11. " " 15 + 70 " 15 + 70 12. " " 140 + 00 " 15 + 70 13. " " 15 + 70 " 15 + 70 15. " " 162 + 85 " 162 + 85 16. " " 162 + 85 " 162 + 85 17. " " 163 + 72 " 162 + 85 18. " " 164 + 90 " 172 + 94 19. " " 184 + 95 " 176 + 93 19. " " 184 + 95 " 176 + 93 19. " " 184 + 95 " 176 + 93 19. " " 176 + 03 " 179 + 64 19. " " 190 + 96 " 194 + 55 22. " " 183 + 36 " 194 + 55 23. " " 194 + 55 " 194 + 55 24. " " 194 + 55 " 194 + 55 25. " " 194 + 55 " 194 + 55 26. " " 194 + 55 " 194 + 55 27. " " 201 + 87 " 204 + 87 28. " " 201 + 87 " 204 + 87 29. " " 201 + 87 " 204 + 87 29. " " 201 + 87 " 204 + 87 29. " " 201 + 87 " 204 + 87 29. " " 201 + 87 " 204 + 87 29. " " 204 + 18 20. " " 204 + 18 21. " " 204 + 67 " 204 + 87 22. " " 205 + 47 " 204 + 87 23. " " 204 + 86 24. " " 204 + 87 " 204 + 87 25. " " 205 + 47 " 204 + 87 26. " " 204 + 87 " 204 + 87 27. " " 204 + 86 28. " " 204 + 87 29. " " 204 + 87 29. " " 204 + 87 29. " " 205 + 47 207 + 10 " 207 + 87 208. " " 208 + 18 208. " " 209 + 18 209. " "		2002						
2. Key Plan 4. " " 15 + 00 " 36 + 47" 5. " " 36 + 47" " 58 + 47" 7. " " 58 + 47" " 78 + 35 8. " " 92 + 56" 106 + 62 " " " 9. " " 106 + 62 " 116 + 47" " " 10. " " 115 + 00 " 127 + 00 11. " " 127 + 00 " 140 + 00 12. " " 155 + 01 " 155 + 01 13. " " 151 + 70 " 155 + 01 14. " " 155 + 01 " 158 + 72 15. " " 165 + 45" " 165 + 85 16. " " 165 + 45" " 165 + 85 17. " " 165 + 45" " 165 + 85 18. " " 165 + 45" " 168 + 95 19. " " 168 + 95 " 172 + 43 11. " " 172 + 43 " 170 + 03 12. " " 183 + 36 " 172 + 43 22. " " 184 + 36" 172 + 43 23. " " 190 + 64 " 183 + 36 24. " " 190 + 96 " 194 + 55 25. " " 194 + 55 " 198 + 29 26. " " 194 + 55 " 198 + 29 27. " " 201 + 87" 209 + 18 28. " " 201 + 87" 209 + 18 29. " " 201 + 87" 209 + 18 21. " " 201 + 87" 209 + 18 22. " " 201 + 87" 209 + 18 23. " " 201 + 87" 209 + 18 24. " " 201 + 87" 209 + 18 25. " " 201 + 87" 209 + 18 26. " " 201 + 87" 209 + 18 27. " " 201 + 87" 209 + 18 28. " " 201 + 87" 209 + 18 29. " " 201 + 87" 209 + 18 20. " " 201 + 87" 209 + 18 21. " " 201 + 80" 221 + 06 22. " " 201 + 87" 209 + 18 23. " " 201 + 88" 216 + 86 24. " " 201 + 88" 216 + 86 25. " " 201 + 87" 209 + 18 26. " " 201 + 87" 209 + 18 27. " " 201 + 87" 209 + 18 28. " " 201 + 87" 209 + 18 29. " " 201 + 87" 209 + 18 20. " " 201 + 80" 221 + 06 21. " " 201 + 80" 221 + 06 22. " " 201 + 80" 221 + 06 23. " " 201 + 80" 221 + 06 24. " " 201 + 80" 221 + 06 25. " " 201 + 80" 221 + 06 26. " " 201 + 80" 221 + 06 27. " " 201 + 80" 221 + 06 28. " " 201 + 80" 221 + 06 29. " " 201 + 00" 221 + 06 20. " " 201 + 00" 221 + 06 21. " " 201 + 00" 221 + 06 22. " " 201 + 00" 221 + 06 23. " " 201 + 00" 221 + 06 24. " " 201 + 00" 221 + 06 25. " " 201 + 00" 221 + 06 26. " " 201 + 00" 221 + 06 27. " " 201 + 00" 221 + 06 28. " " 201 + 00" 221 + 06 29. " " 201 + 00" 221 + 06 20. " " 201 + 00" 221 + 06 20. " " 201 + 00" 221 + 06 20. " " 201 + 00" 221 + 06 20. " " 201 + 00" 221 + 06 20. " " 201 + 00" 221 + 00" 20. " " 201 + 00" 221 + 00" 20. " " 20. " 20. " 20. " 20. " 20. " 20. "		4	toute	tive E	islat	- Leg	Filing Plan	1.
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PRELIMINARY DRAWINGS

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                      223 + 17
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51.
   Boylston St. Connection-Framing Plan
52.
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                             -Construction Operations
53.
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                             -Section A-A
54.
                             - " B-B
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55.
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56.
     Ventilation-Plan
57.
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         " - Details
58.
     Typical Concrete Sections for Open Cut
59.
60.
     Underpinning NY., N.H. & H. & B.&A.R.R. Tracks
61.
     Tunnel Under N.Y., N.H. & H. & B. & A.R.R. Tracks
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68.
     Underpinning Buildings Over Subway
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     Typical Concrete Section For Crossovers
70.
     Typical Section At Stations
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PRELIMINARY DRAWINGS

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PRELIMINARY DRAWINGS

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137. Williams St. Abutment
138. Elevated Bents
139. Brookley Road Connection-Plan
140 " " Construction Operations
141. Filing Plan -Alternate Route
142. Key Plan-
143. Alignment-Station 78+35 To 94+00 Alternate Route
144.
145. Profile- " 78+00 " 99+00 " " " " "
146. The Mark 199+00 " 120+00 " " " "
147. Underpinning Elevated Columns
148. Dudley St. Station-Alternate Route-Schemes A & Al-Plan
149. Scheme A-Invert & Roof
Framing -Plan
150. " " " A-Passageway Roof
Framing-Plan
151. " " " " "-Section A-A

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ALTERNATE DRAWINGS

Plan	No.				Т	itle		
201.	Ventil	ation	- Pl	an				
202.	11			-111-				
203.	Typic	al Be	ent fo	r Open Cu	it Abov	re Gr	ound W	Vater Level
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205.	Under	pinn	ing N	Y., N.H	. & H. 8	&B. 8	& A. R.	. R. Tracks-Alternate 1
206.	F1		F1	11	11 11	11	11 11	" -Alternate 2
207.	11		11	11	11 11	11	11 11	" -Alternate 2
208.	Typic	al Se	ction	at Station	ıs			
209.				Station -		e Al	- Plans	S
210.	11	11	11	FT	11	Ħ	Secti	ion A-A
211.	#1	71	11	11	11	Ħ	FT	B-B
212.	11	11	11	Ħ	H	В	- Plan	ıs
213.	11	11	11	11	11	11	Secti	ion A-A
214.	11	11	-34	84	11	Ħ	11	B-B
215.	11	11	11	11	11	B1	- Plan	ns
216.	11	11	91	řt .	11	11		tion A-A
217.	††	†1	11	11	11	11	31	B-B
218.	Massa	achus	setts	Ave. Stati	ion - S	chem	e A1 -	
219.		F1		т н		11	11	Section A-A
220.		1-1		11 11		FI	11	" B-B
221.	Dudle	v St.	Sta.	-Legislati	ive Roi	ıte-S	chemes	s B&BI - Lower Level
222.	11	11	H	11		11	11	H H - Upper Level
223.	11	11	11	11		Ħ	11	"
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225.	11	11	11	Ħ		11	11	H H _ H H
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227.	31	21	11	11		11	11	H H - Const. Procd.
228.	11	11	31	11		11	11	" - Reroute Transn.
229.	11	11	F1	11		11	11	BI - Framing Plans
230.	11	11	11	11		11	11	" - Section A-A
231.	11	11	FI	11		11	FT	" B-B
232.	11	11	71	11		11	11	C & CI - Plan
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ALTERNATE DRAWINGS

Plan No. 10 100 and the plan of the Title					
247. Columbus Ave. Station - Scheme B & BI - Sections					
248. Concrete Liner Method For Stony Brook Conduit					
249. Steel Rib & Precast Reinf. Conc. Slab for Stony Brook Conduit					
250. Atherton St. Bridge Abutment					
251. Dudley St. Sta Alternate Route - Scheme Al-Framing Plan					
252. We have $\mathbf{u} \in \mathbb{R}^n \to \mathbb{R}^n$					
253. I Hard And Andrew Market Section A-A					
254. 19 19 19 19 19 19 19 19 19 19 19 19 19					
255. And the transfer of the Bearing Plans					
256. The final polynomial polynomial for the final polynomial $n \in \mathbb{N}$, $n \in \mathbb{N}$, $n \in \mathbb{N}$ and $n \in \mathbb{N}$					
257. Pro " Pro " A C" School and Tage " Washer as " Section A-A					
258. " Section B-B					
259. 18 1 B1-Framing Plan					
259. Par Property Plans					
261. The Walter Land Walter Land Walter Land Walter Section A-A					
262. The $\mathbf{u}_{i,j}$ and $\mathbf{u}_{i,j}$ are specifically an expression of $\mathbf{u}_{i,j}$ and $\mathbf{u}_{i,j}$ and $\mathbf{u}_{i,j}$ and $\mathbf{u}_{i,j}$					

Note:

The above listed "Alternate Drawings" show details of studies which were made at the locations indicated. These drawings have been superseded by the "Preliminary Drawings" previously listed but they are submitted with this report for information and filing.

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The above listed "Alternate Drawings" show details of studies chave chave made at the locations indicated. These drawings have uperseded by the "Preliminary Drawings" previously listed by the "Breliminary Drawings" previou

SUPPLEMENTARY DRAWINGS

	Description Control of the Control o	File P	lan No.
BORINGS	- Contract Plans showing location of Borings and Wells Record Plans showing detailed	BOR. (7)	
	locations of Borings and Wells Profile of Earth Strata at Borings		5-10 11-14
ALIGNMENT	- General Plan and Profile at Scale 1"=100' Horizontal and 1"=20' Vertical (Roll Plan)	AL	1
SUBSURFACE STRUCTURES	Record Drawings of Sub-Surface Structures (Sewers, Water, Gas, Electricity, Etc	SS	0-33
RELOCATION OF SEWERS & WATER	- Proposed Relocation of Sewer and Water Lines	R	1-33
	- Record Plan and Profile of Stony Brook Culvert	SB A	1-8
	- Right of Way sections of proposed Embankment along New Haven R.R. right of way	SB	9-11
	C - Map of Real Estate showing AP Property affected by proposed subway	RE "A",	1-34 & 15B TO 18B
BUILDING PLA	NS - Nos. 915-919 Washington St.		
	 923-925 Washington St. (A 929 Washington St. 941-945 Washington St. 		rawings 2 3
	" 973-977 Washington St. (50 Castle St.)	BR ()	4
	" 16-16A Mayo St. " 985-989 Washington St. " 991-999 Washington St.	BR BR BR	5 6 7
	" 1001-1009 Washington St. " 6-12 Cobb Street	BR BR	8 9

SUPPLEMENTARY DRAW

Plan No	File	Description	
1-4 5-10 11-14	BOR BOR BOR	of Borings and Wells Record Plans showing detailed locations of Borings and Wells Profile of Earth Strata at Borings	- cillulaua
Д	AL	Scale 1"=100' Horizontal and 1"=20' Vertical (Roll Plan)	ALIGNMENT PLAN
0-33	ss	- Record Drawings of Sub-Surface Structures (Sewers, Water, Gas, Electricity, Etc	SUBSURFACE STRUCTURES
1-33	R	- Proposed Relocation of Sewer and Water Lines	RELOCATION OF SEWERS & WATER
1-8	SB	- Record Plan and Profile of Stony Brook Culvert	STONY BROOK
9-11	SB	Right of Way sections of proposed Embarrace aircs New Haven R. R. right of way	
1-34 & 15B TO 18B	RE "A",	- Map of Real Estate showing	
	50	10 - Nas, 910-910 Warnington 50,	entranscript
		923-925 Washington St. (Ar	
2	BR	" 929 Washington St.	
3	BR	" 941-945 Washington St.	
	BR	(50 Castle St.)	
4 5	BR	" 16-16A Mayo St.	
9	BR	" 985-989 Washington St.	
7	BR	" 991-999 Washington St.	
8	BR	" 1001-1009 Washington St.	
6	BR	" 6-12 Cobb Street	
	J. C.	-48-	

SUPPLEMENTARY DRAWINGS

<u>Description</u>	File Plan No.
BUILDING - Nos. 15-19 Lucas Street	BR 10
PLANS 10 Compton Street	BR 11A
" 11-11 1/2 Cobb Street	BR 11
" 11-13 Compton Street	BR 12
" 15-17 Compton Street	BR 13
" 12-12A Compton Street	BR 14
" 14 Compton Street	BR 15
" 11-17 Waterford Street	BR 16
19-21 Waterford Street	BR 17 & 17A
1083-1085 Washington	
(16-18 Waterford)	BR 18
" 1093-1095 Washington Street	(Architect's Plans)
" 10-14 Garland Street	BR 19
" 76-74A Dover Street	BR 20
" 2101-2115 Washington Street	BR 21
" 2121-2131 Washington Street	BR 22
" 2148-2154 Washington Street	BR 23
2164-2168 Washington Street	BR 24
" 2172 Washington Street	BR 25
2-6 Warren Street	BR - 26 26
18-20 Warren Street	BR 27
" 15-19 Warren Street	BR 28
Dudley Street Station (MTA PLANS)	
Nos. 112-116 Dudley Street	(Architect's Plans)
44-50 Roxbury Street	BR 29
Underpass Minton Street	BR 30
No. 80 Dudley Street	(Architect's Plans)
No. 4 Kenilworth Street	(Architect's Plans)

NOTE:

In the case of buildings not listed above but shown on the real estate appraisal maps photographs are on file in the Boston office of Praeger-Maguire and Singstad & Baillie.

Additional Plans Available at office of Praeger-Maguire and Singstad & Baillie but not included in report.

Map of Survey from Bartlett to Lenox Streets-map prepared by Praeger-Maguire & Singstad & Baillie of survey along the route of the proposed subway. Survey made by M. T. A. and P. M. & S&B.

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20	BR	76-74A Dover Street	11			
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23	BR	2148-2154 Washington Street	-91			
24	BR	2164-2168 Washington Street	11			
25	BR	2172 Washington Street	11			
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In the case of buildings not listed above but shown

le in the Boston office of Praeger-Maguire and
Singstad & Baillie.

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Singstad & Baillie but not included in report.

Map of Survey from Bartlett Street to Forest Hills - map prepared

SUPPLEMENTARY DRAWINGS

	Description	File	Plan No.
-	Map of Survey from Ball to West Springfield to Hanson Streets Map		
	prepared by M. T. A	SUR	6
-	Map of Survey from West Springfield to Hanson Streets, Map prepared by		
	M. T. A	SUR	7
	Map of survey from Dover to LaGrange Streets along route of proposed subway		
	Map prepared by PM and S.&B. From	m	0
	survey by M. T. A. and PM. and S. &:	B. SUK	8
-	Section of Stony Brook Culvert		
(Scale 1/4 "=1 ft.)	SB	12
	Highway Department Map-Shawmut Ave from Sterling Street to Dover Street (City of Boston)	•	

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	auz	- Map of Survey from Ball to West Springfield to Hanson Streets Map
÷.	Aus	- Map of Survey from West Springfield to Hanson Streets, Map prepared by
Ş	ay.	- Map of survey from Dover to LaGran Streets along route of proposed subw Map prepared by PM and S. &B. F. survey by M. T. A. and PM. and S.
12	£2.	(Scale 1/4 "=1 ft.)
	.ve,	Highway Department Map-Shawmut A

Plan No.	Title	
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T-a-14644	11 11	Sheet 5 of 14
T-a-14645	11 11	Sheet 6 of 14
T-a-14646	11 11	Sheet 6 A
T-a-14647	H 11	Sheet 7 of 14
T-a-14648	11 11	Sheet 7 A
T-a-14649	11 11	Sheet 8 of 14
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Sheet 7 of 14 Sheet 7 A	11	11	T-a-16269
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M. T. A. Drawings

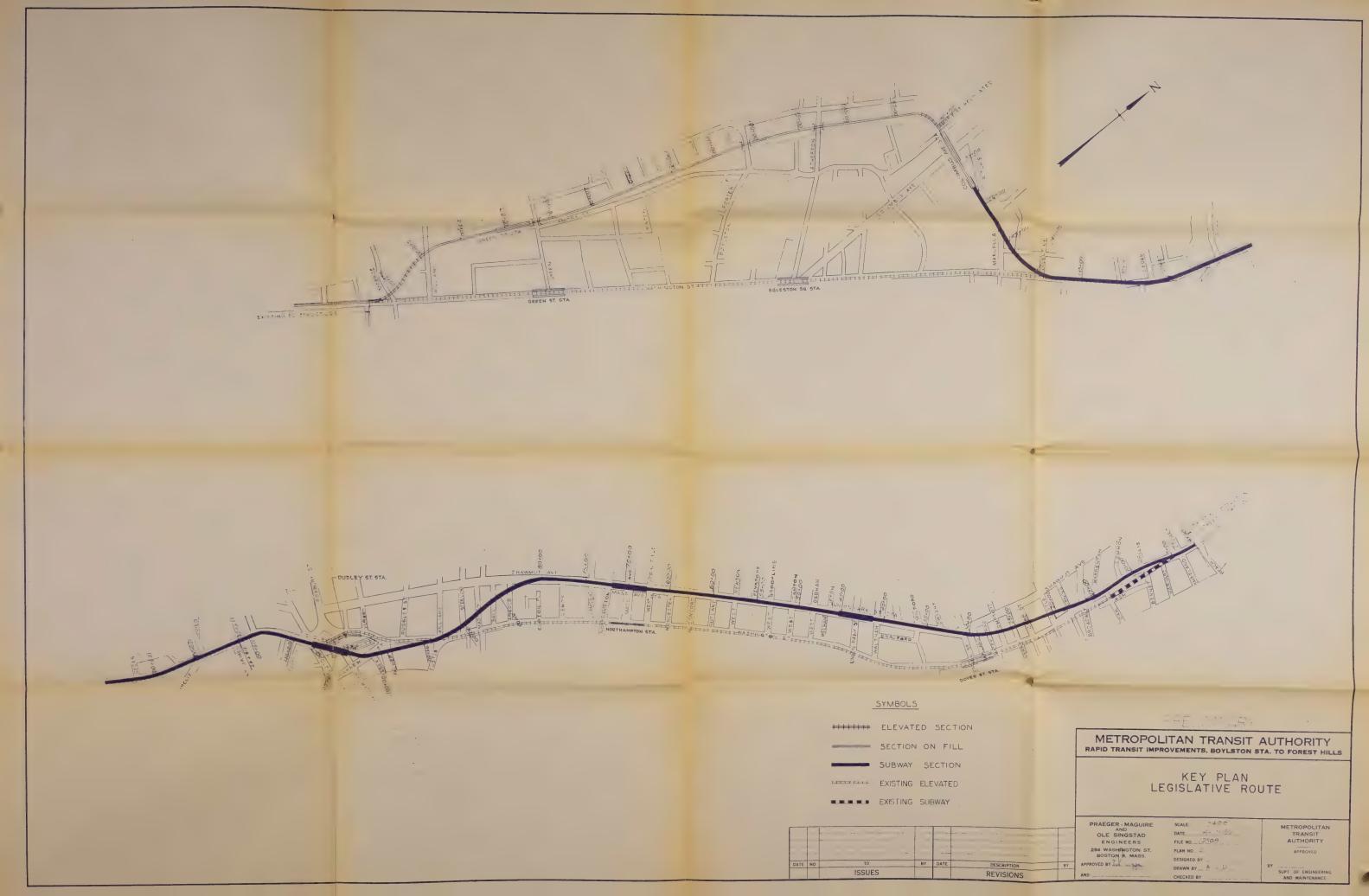
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T-a-14772	11	F1	Sheet 10 of 14
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T-a-14774	11	11	Sheet 12 of 14
T-a-14775	11	11	Sheet 13 of 14
T-a-14776	11	11	Sheet 14 of 14

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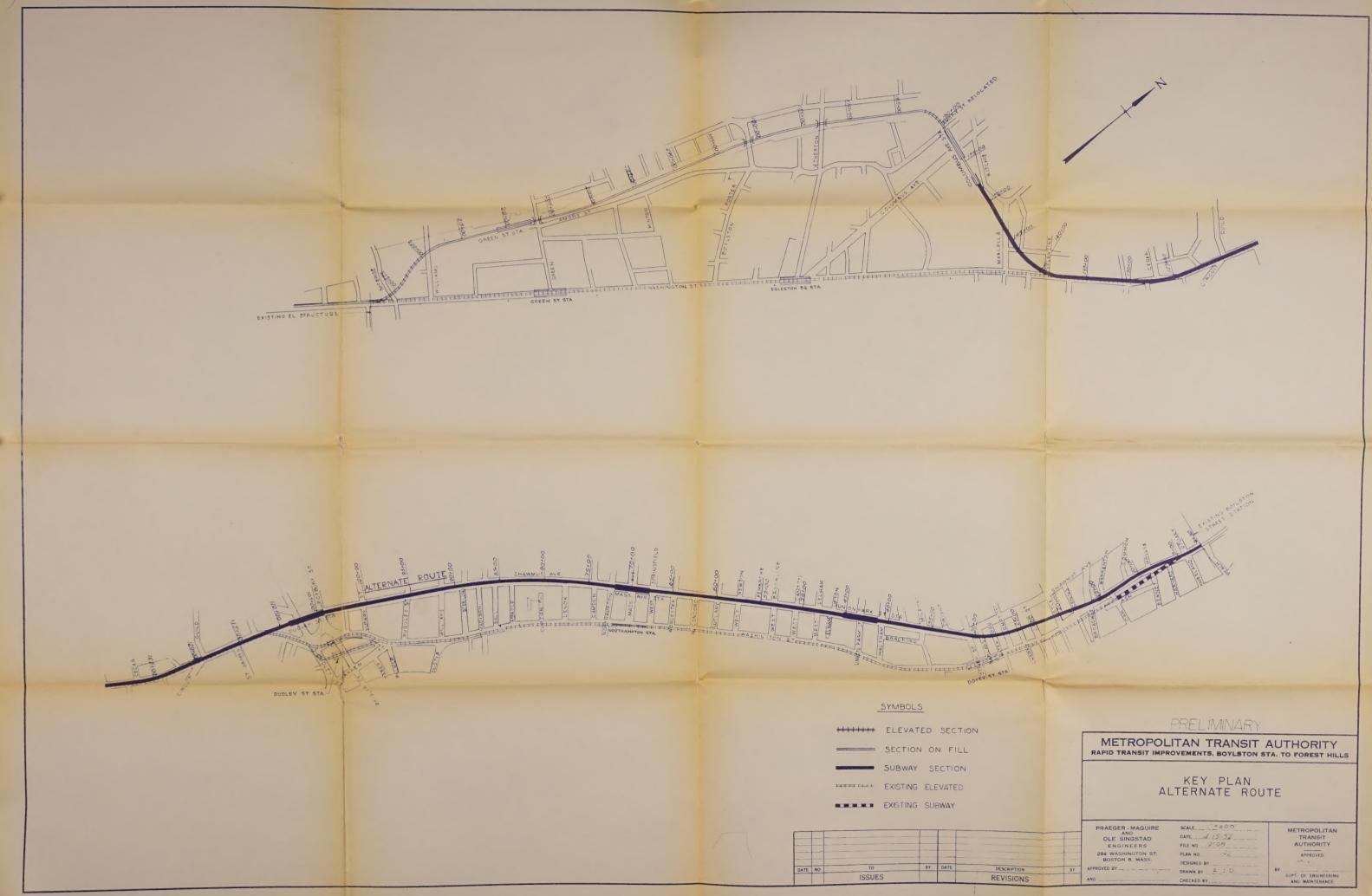
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